VOLUME 11 NUMBER 8 AUGUST 1985 **$2.95**

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# Creative Computing

THE #1 MAGAZINE OF COMPUTER APPLICATIONS AND SOFTWARE

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## Hard Disks: The New Landscape

**IN-DEPTH EVALUATIONS:**
- The Sider
- Citizen MSP-20
- Sanyo MBC-775
- HP Portable Plus
- Ten Personal Finance Packages

- Tsukuba Expo '85
- Preview: Commodore PC
- Choosing A Printer For Your Portable
- Forrest Mims: PCs For The Disabled
- Improve Your Program Listings
- Software Digest

Columns: Books, Industry Insider, Apple, IBM, Atari, Commodore, New Products, I/O

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JUL 1985

# At NEC, monitors and printers are not peripheral issues.

All too often, brand-name CPUs are "bundled" with mediocre peripherals — a practice that makes for profitable sales, but does nothing for the system's performance.

In Japan, where most computer peripherals are actually built, NEC is the largest personal computer company — by far. And NEC didn't make it to first place by offering second rate peripherals.

## The monitors with the broadcast video heritage.

While dozens of companies market display monitors, only a handful possess the tube technology and manufacturing capability to actually *build* them. NEC is one of the few. In fact, NEC's complete line of color and monochrome monitors reflects the professional and broadcast video expertise that twice earned NEC Emmy Awards from the National Academy of Television Arts & Sciences.

## Winning the printer race takes both speed and endurance.

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VOLUME 11 NUMBER 8 AUGUST 1985

# Creative Computing

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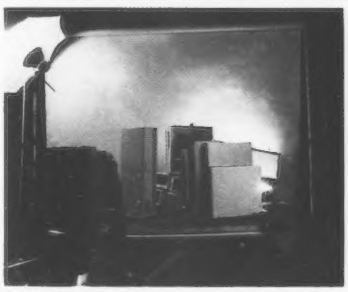

For this month's cover, we used hard disk drives to construct a model city in photographer Jeff MacWright's studio. The article begins on page 28.

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# INPUT/OUTPUT

## Wondrous Improvement

Dear Editor:

I am a high school math and computer teacher. I was pleased to see some programming problems in your April, 1985 issue. I hope you can include more in future issues.

I take issue with W. Lloyd Milligan, ("Wondrous Numbers and Other Diversions", p. 99), when he says that "you can never be sure that a number is not wondrous." While this may be true, I think that credit should have been given where due. The mathematician S. Ulam conjectured that no matter what the starting integer is, eventually the number 1 will be obtained.

Also, I'm bothered by the number of unconditional GOTOs in Mr. Milligan's program. I have taken the liberty to edit his program for a more aesthetic flow:

```
10 PRINT "WONDROUS NUMBER TESTER"
20 INPUT "ENTER NUMBER TO BE TESTED"; N
25 IF N < 1 THEN 20
30 M = N : I = 0
40 IF M/2 = INT (M/2) THEN M = M/2: GOTO 60
50 M = M*3 + 1
60 I = I + 1
70 IF M > 1 THEN 40
80 PRINT I; "ITERATIONS ARE NEEDED TO MAKE"; N; "WONDROUS."
90 END
```

Thanks for a good magazine.

Rodney D. Hixon
127 1/2 Antoinette Ave.
Fairbanks, AK 99701

## Cryptic Arrows?

Dear Editor:

We all have our hangups, but Assistant Editor Russ Lockwood's continual harping about "cryptic arrows, rather than English labels (for) the Tab, Backspace, Return, and Shift Keys" is starting to wear thin.

It also reveals his ignorance of the keyboard marketplace.

I suggest Mr. Lockwood take a look at the International Standard (ISO 1090-1981(E), "Function Key Symbols on Typewriters") where these arrows are all clearly defined. I am not aware of an ANSI, BSI, or DIN equivalent, but the AFNOR (French National Standard) equivalent is NF E 55-052.

Mr. Lockwood is certainly entitled to prefer words to symbols on his keyboards, but he should realize that the use of function key symbols results in considerable cost savings where most computer and typewriter manufacturers are trying for a worldwide market. Larger markets mean longer production runs and other economies of scale which hopefully result in lower prices to the end user.

There are enough alphabet-, language-, and convention-related problems in the keyboard that resist solution without knocking one of the few advances that have been made toward the universal keyboard.

Peter F. Soule
General Manager
Continental Sales Co.
B.P. 20
F-63800 Cournon D'Auvergne
France

*New computer users, or those upgrading to an IBM PC or compatible, do not need the added confusion of unlabeled keys. Sure, we adapt, much the way touch typists adapt to the misplaced backslash key, but that does not make such a process convenient. ISO and AFNOR notwithstanding, I fail to see how two arrows pointing in opposite directions represent Tab. I'm not against arrows per se—cursor keys are a marvelous place for them—but I want to know exactly what each key does without looking it up in a manual. The more information under hand, the less confusion to the user.* —RSL

## Modems "R" Us

Dear Editor:

After reading your May article, "Modem Magic," I felt compelled to write to you and relay some pricing information I encountered during my selection of a modem.

After my initial feature comparisons, I decided to purchase a 300 baud modem that had external direct-connect features. Then came the task of finding an affordable modem with the features I wanted. After reading your informative article, I decided that I could not find the modem I wanted for under $120—which might as well have been $1000, since, at the time, I was a poor college student.

So I abandoned the idea of entering the telecommunications world. But, lo and behold, I tripped over exactly what I was looking for at an affordable price, and in an unlikely store. Toys "R" Us sells the Commodore 1660 modem with all of the above features plus an originate/answer switch and an audio speaker for $69. This is almost half the price of other stores.

So now I am happily typing away to my new beau in Oklahoma whom I met on the CB-simulator of CompuServe.

April L. Amey
702-20 Lindsley Dr.
Morristown, NJ 07960

*We're glad to hear that you have entered the world of telecommunications—even more so that our May issue helped you choose a modem. As for cost, the prices we publish are the manufacturers' suggested list prices. Retail stores and mail order houses often offer discounts, so your purchase price is frequently less than the list price. We invite you (and your beau) to visit the* Creative Computing *SIG on CompuServe (PCS-22).* —RSL

# NOTICES

## Printer Enhancers Update

Alpha Software Corp. has recently upgraded *Type Faces* ("Printer Enhancers," *Creative Computing*, July, 1985). *Type Faces II* features two modes, compressed (lettering the size of a letter-quality printer) and regular (24 to 36 point size), and allows unlimited font changes within the same line. Additional enhancements include a window to DOS, a preview feature, complete mail merging facility, complete word processing commands, and a font editor package for creating new type styles.

Alpha Software Corp., 30 B St., Burlington, MA 01803, (800) 451-1018.

Hammerlab Corporation, manufacturer of Lettrix ("Printer Enhancers," July, 1985) has recently moved. They now can be reached at:

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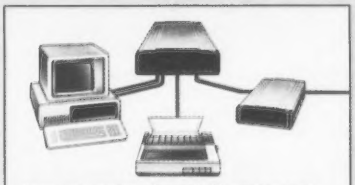
Two computers can share one printer with Transet 1000. Or, you can use Transet 1000 to let two computers communicate with each other.

In addition, Transet 1000 is a port expander and software-controlled I/O switcher. Now files can be easily directed and redirected to different peripherals, without physically changing cable connections.



Even while printing, Transet 1000 acts as a communications buffer and 24-hour mailbox. And I/O switching lets you route information among peripherals, without switching cables.

Transet 1000 contains a standalone microprocessor, and comes with 128K of memory. It operates with any RS-232C interface computer, and has optional accessory kits available for the IBM PC and PC XT, Macintosh and Apple IIc. Kits contain the necessary host cable, a user guide and menu-driven software that lets you graphically set up or customize port parameters and printing formats. Cables available for IBM PC AT, other computers and peripherals.

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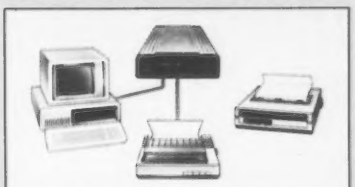

Transet 1000 allows printing on both a dot matrix printer and letter quality printer, while freeing your computer for other tasks.

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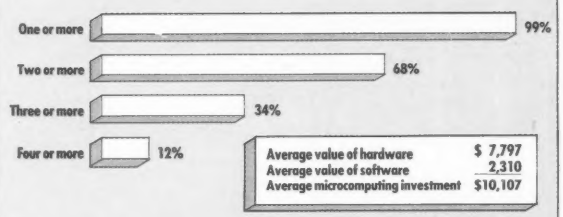
CIRCLE 113 ON READER SERVICE CARD

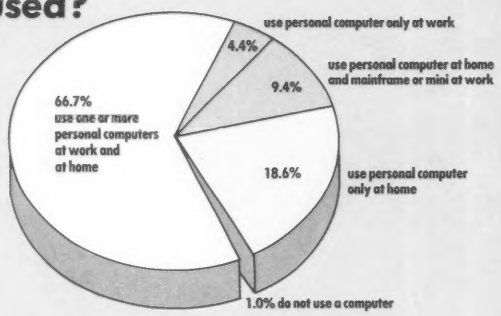
# What Sort of Person Reads Creative Computing?

Readers are knowledgeable, dedicated computer users

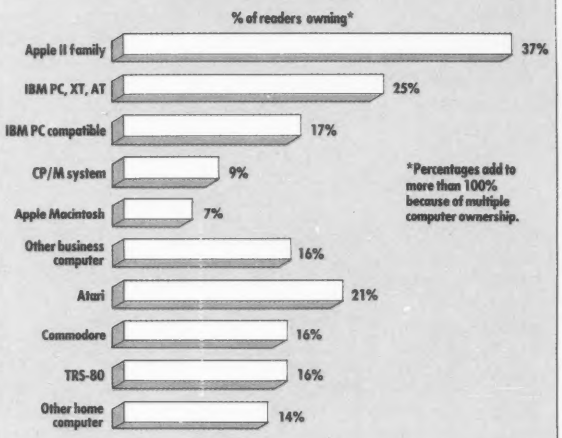
## How many computers do readers use or own?




## Where are these computers used?


use personal computer only at work
4.4%
use personal computer at home and mainframe or mini at work
9.4%
66.7%
use one or more personal computers at work and at home
18.6%
use personal computer only at home
1.0% do not use a computer

## Which brands are used?




The average reader of *Creative Computing* is a male, 37 years old. He has an income of $38,300, uses 2.1 computers at work and at home, and has $10,107 invested in computer hardware and software. His primary computer is equipped with two floppy disk drives, dot matrix printer, monitor, and modem. He regularly uses word processing and database software and writes programs in Basic. This is the profile that emerges from our most recent survey.

The survey form was bound into the February 1985 issue of the magazine and was returned by both subscribers and newsstand buyers—945 in total. Some subscribers who were receiving *Creative* in place of one of the several magazines folded by Ziff-Davis in the past year took the opportunity to let us (and Ziff) have it with both barrels, but for the most part the survey returns were complete and the comments thoughtful. And we believe the respondents are representative of the readership as a whole.

### Computer Ownership

The computers used by readers run the gamut from a single Sinclair ZX81 to three or four IBM PC XTs. Thirty-one percent of readers own (or use) one computer; 34%, two; 22%, three; 12%, four or more; and 1% do not use a computer at all. That works out to an average of 2.13 computers per reader; it is probably easier to say that 68% of our readers use two or more computers—most frequently a home-oriented machine and one or more computers for business purposes.

Apple II computers are the most widely used by readers, with 37% having one or more Apple II machines. IBM PCs, XTs, and ATs are used by 25% of our readers, and PCjrs by another 2%. Add in the 17% who use IBM compatibles, and you get a total of 42% with IBM PCs or look-alikes.

CP/M systems are used by 9% of our readers; nearly half are Kaypros. "Other business computers" are used by 23% of our readers. About one-third are Apple Macs and one quarter are TRS-80 Model 100s. Quite a few Epson QX-10s show up here also. Incidentally, we put the Mac in this category out of deference to Steve Jobs who would like the world to believe that the Mac is a business computer; in fact, 72% of our Mac owners use their Macs at home.

Among home-oriented computers, Atari leads the pack with 21% ownership. This is followed by Commodore (16%), TRS-80 Model 1, III, and 4 (11%), TRS-80 Color Computer (5%), and "other home computer" (14%). This latter category is most likely a TI 99/4A, Timex/Sinclair, PCjr, or Coleco Adam.

The computers used by readers are remarkably well equipped, even those machines normally thought of as "low end." Over 89% are equipped with one or more floppy disk drives, and 13.1% have hard disk drives. Dot matrix printers are found on 77.6% of the machines, and daisywheel printers on 18.8%. Monochrome monitors are on 58.1% of

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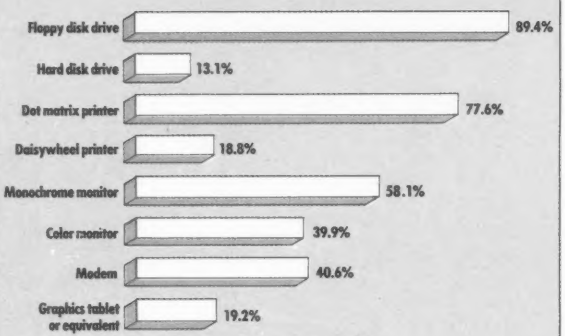
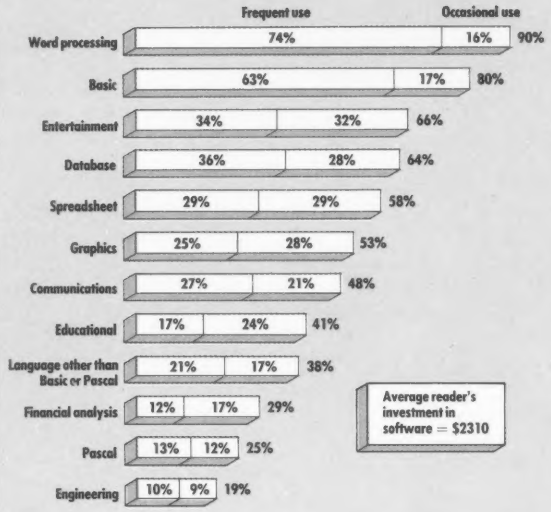
## How well equipped are the systems?




## How is software utilized?




the computers, and color monitors on 39.9%. Over 40% have modems, and just under 20% have graphics tablets or equivalents.

As might be expected, well-equipped machines aren't cheap. The average value of readers' "most used" system (most often a home-oriented machine) is $3178 while the second most used system (most often a business machine) is $4799. The highest average value by brand is for the 111 readers who listed an IBM PC as their second most frequently used computer; on average these machines were valued at $7853.

On average, the readers of *Creative Computing* are regular users of $7797 worth of hardware and $2310 worth of software for a total investment of $10,107.

### Used for Many Things

The readers of *Creative Computing* tend to be intensely involved with computers, both at work and at home. Two thirds use one or more personal computers at work and at home, while another 9.4% use a personal computer at home and a mainframe or minicomputer at work. Only 4.4% use a personal computer only at work, but 18.6% use one only at home. As mentioned earlier, 1% do not use a computer at all. Thus, overall, 80.5% use a computer at work and 94.7% use one at home.

What are these computers used for? Just about everything. Word processing is used by 90% of our readers with 74% using it frequently. Other heavily used packages include database, spreadsheet, graphics, communications, and entertainment software. Lesser, but still significant use is given to educational, financial analysis, engineering, and music synthesis packages.

Basic is the language most often used for programming, with 80% of readers using it frequently or occasionally. Pascal is used by 25%, and a language other than Basic or Pascal (Forth, C, assembly, etc.) is used by 38% of our readers.

### Editorial Preferences

With the overall decline of advertising in the personal computer industry and, thus, fewer pages with which to work, we feel it is vital to bring you material of the highest quality and most relevance possible. Readers expressed maximum interest in product previews, information about new hardware and software, technology articles, and the Industry Insider column. Also high on the list are programming tutorials, graphics articles, ideas/philosophy, and the Teletalk Column.

Readers expressed strong interest in reviews and evaluations of all types of computers, printers, and other peripherals, and a wide range of software. As might be expected, interest in our machine-specific columns more or less paralleled the percentage of readers owning the particular machine, although Tandy owners tended to be a bit more vocal than Commodore owners.

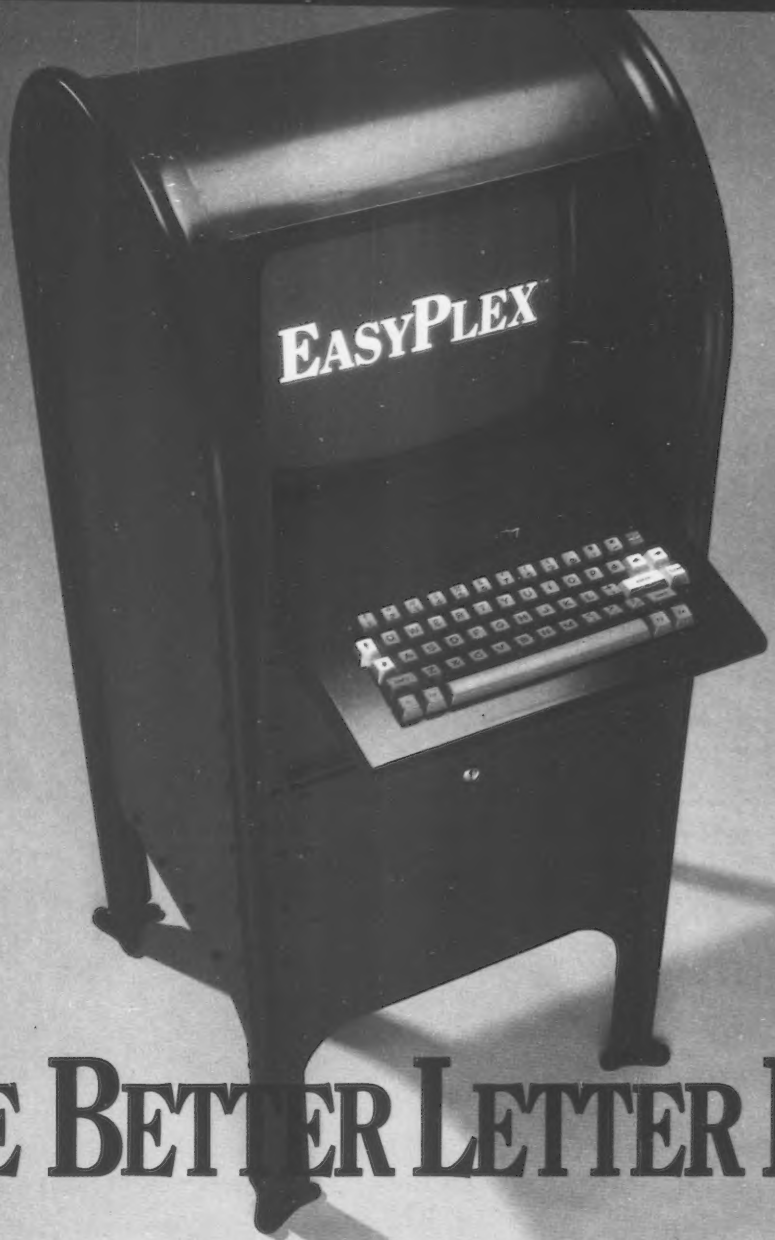
### Demographics

The average annual income of readers is $38,300 (including those employed part-time, and students). Considering just those employed full-time adds some $10,000 to the average. The average age is 37 and 92% of our readers are male. Geographic dispersion is similar to the population as a whole with a slight leaning toward the two coasts.

The job titles fall mainly into three broad categories: professional, technical/scientific, and managerial. In addition, 9% of the respondents are not currently employed, being either students or retired.

Over 20% of the readers wrote a comment on the survey form, and many attached several pages. By and large, these comments indicate that our readers are exceptionally knowledgeable and frequently provide advice to friends and business associates as to computer and peripheral purchases as well as the most effective use of computer systems. The most often heard plea was for more applications tutorials, and, as you have probably noticed, we are now running more of this type of material.

As we have said so many times, we consider all of you part of the *Creative Computing* family, and with your help and feedback we will continue to evolve and grow together. ■




# THE BETTER LETTER BOX

**Introducing EasyPlex™. The new, easy-to-use electronic mail system from CompuServe.**

Finally! Electronic Mail that's so easy to use you can start composing and sending messages the first time you get online.

Designed for various experience levels, EasyPlex has a menu mode with simple, easy-to-follow directions for beginners, and it lets experienced users save time by working in the prompt or command modes. With EasyPlex, you can compose, edit, send, file, and take advantage of sophisticated options previously available only with more expensive services.

CompuServe's EasyPlex lets friends and relatives, associations and club members communicate any time of the day or night. And small business owners, real estate professionals, insurance agents, lawyers, writers, etc. can communicate quickly and simply— either interoffice or interstate. "It's Easy." "Just Plex it!"

Best of all, EasyPlex is available to all CompuServe subscribers. And, along with EasyPlex, you get hundreds of valuable and entertaining computing options. Plus the assurance of belonging to the largest, fastest growing computer information service in the world and the premier supplier of business information to FORTUNE 500 companies.

Start communicating! To buy a CompuServe Subscription Kit, see your nearest computer dealer. To receive our informative brochure or to order direct, call or write:

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Information Services, P.O. Box 20212
5000 Arlington Centre Blvd., Columbus, Ohio 43220

**800-848-8199**
In Ohio, call 614-457-0802

An H&R Block Company

**CIRCLE 105 ON READER SERVICE CARD**

# Radio Shack Networks Offer a Multiple Choice in Shared Learning Systems

Radio Shack's shared learning systems give you a choice when you're building a computer system for the classroom.

Whether you're looking for a cassette-based system for a few students, or a powerful floppy or hard disk system for more than 60 students, Radio Shack's Education Division has the right equipment for your needs.

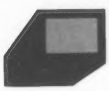
And only Radio Shack backs up its educational computer hardware and software with the unmatched commitment to education of our parent company: the Tandy Corporation.

## NETWORK 2

Bring as many as 16 student stations into a single educational network with our Network 2 Controller (26-1211, $499.00).

Network 2 lets you use a host computer system to load a program to all 16 student stations simultaneously through the cassette port. Students can send programs they've written to the host computer one at a time for storage. With an optional printer attached to the host system, the programs can be printed out.

The Network 2 Controller works with Model I/III/4 or Color Computer or Model 100 systems, and additional Controllers can be cascaded to make larger shared systems.



## NETWORK 3

A Network 3 Controller (26-1212, $599.00) allows as many as 16 student stations to independently access lessons stored on the host computer system, so the teacher is freed from repeatedly loading individual programs.

With a Network 3 Controller, students can access the host computer's disk drives and printer for storage and printing without teacher assistance. And Network 3 learning systems are supported by the best in educational software, including the Philadelphia Computer Assisted Reading Development Program, Network Pascal, primary and secondary math and science programs, educational games and more. You can even use Network 3 systems with programs you develop using our easy-to-learn AUTHOR I authoring system.

CIRCLE 122 ON READER SERVICE CARD

The Network 3 learning system requires Controller, Network 3 Operating Software, a Model III/4 host and Model III/4 student stations. Optional use of a hard disk and hard disk operating software offer greater speed and flexibility.

## NETWORK 4

Our Network 4 learning system uses advanced networking technology to bring as many as 63 student stations into a powerful hard disk system.

Students working at Model III/4 stations in the system have access to hard disk files. Each station operates virtually as a stand-alone system, with quick access to sets of programs and data files. Students can also access an optional printer, connected to the host, without teacher assistance.

The Network 4 learning system requires Model III/4 stations, each with a Network 4 upgrade; a host 64K Model 4; a hard disk drive; cables and operating software.

Only Radio Shack offers educators the assistance of full-time computer professionals, trained in the latest in classroom computing, located across the country for your convenience.

**For the name of the Regional Educational Coordinator in your area, call 800-433-5682, toll free. In Texas, call 800-772-8538.**

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# INDUSTRY INSIDER

## Insider goes to France/David H. Ahl

### Does France Matter?

The U.S. doesn't have a huge trade deficit with France. High tech goods from France pose little threat to American manufacturers. In political economics, the French seem to march to a different drummer than the rest of the Western world; witness Mitterrand's refusal at the Bonn conference to fix a date for new trade talks. Why, then, should we be interested in what the French are doing in microcomputing and other interactive technologies? For several reasons.

First, since the French got a relatively late start in microcomputers (for a Western nation), they have had a chance to look at many things that went wrong in other countries.

Second, the French have a much more widespread system of videotext than any other nation in the world. Currently, more than 800,000 people have terminals, and PTT (the French national telephone company) is committed to putting a terminal on every residential telephone in the country within the next five years.

Third, most software developers in France are active in more than one medium, usually computer software and interactive video; this often leads to valuable synergy between artists and technologists.

Perhaps of greatest long range significance is the French approach to using computers in schools. Unlike the situation in the U.S. where the computers are generally administered by the math department and are most often used to teach computer literacy or programming, the French view the computer as a tool for helping to teach other subjects. Outstanding instructional programs have been developed for teaching French and foreign languages (by Hatier) and music (by Logimus). Other companies such as VIFI are gearing software packages to the school curriculum on a grade by grade level in math, French, English, and other subjects.

Furthermore, the government has committed to more than 45,000 microcomputer installations in schools by the end of 1985. More than 12,000 of these installations will consist of an IBM PC compatible (from Bull or Goupil) as the node in a network of six Thompson MO5 or TO7 computers. The remaining 33,200 stand-alone installations will consist of a TO7, MO5, or Excelvision 100. An important indication that France is learning from the mistakes of others is the fact that each installation will include a set of 60 to 100 software packages (purchased, not pirated). In addition, 200 million francs, the same amount spent on software, is budgeted for the training of teachers and professors.

**Patrick Marcland and Antoine Cuvelier of Logimus demonstrate software for teaching and playing music.**

Currently, the installed base of computers in France is about 800,000 home machines and 150,000 business systems. Most home units are cassette or cartridge based, but home users are slowly getting more sophisticated and demanding. Annual software sales in the home market are about two million units divided among three or four market leaders (VIFI is the biggest) and nine or ten smaller companies.

The business market is similar to that in the U.S.—moving toward IBM PC compatibles with software dominance by Lotus, Ashton-Tate, Software Publishing (PFS), and other U.S. market leaders along with a handful of French publishers (most of whom are targeting vertical markets or areas with specific French requirements like accounting).

Virtually no French software has achieved any significant sales in the U.S. with perhaps the exception of *Ensemble* (from Controle X), a database for the Mac of which about 20,000 units have been sold in the U.S.

Emmanuel Viau of ERE Informatique, an eight-man software company marketing some 60 packages for six low-end computers, was quite honest about the state of French software. "Until recently," he said, "our games were not as good as those produced in the U.S. and U.K. But we are catching up."

### CESTA

The Center for the Study of Systems and Advanced Technologies (CESTA) is a two-year old organization sponsored by both government agencies and private companies. Its mission is to increase the understanding of complex systems and to study the impact of new technologies on individuals and society. The Center sponsors conferences like Cognitiva '85 (focusing on artificial intelligence) and Int'l Electronic Image Week (in conjunction with Siggraph/France) to be held April 21-25, 1986 in Nice. The Center also publishes books, papers, and newsletters on a wide variety of topics.

On a practical level, one of the most useful activities of CESTA is the Learning Storehouse, a library of educational software. The Center has a huge room with one or two of every imaginable computer on which software from the library can be tried by teachers or other interested individuals. The Center also runs half-day orientation/demonstration courses for 30 to 40 people three days a week. In addition, they publish a catalog which contains short (half page) descriptions of some 600 educational software packages.

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### Apple in France

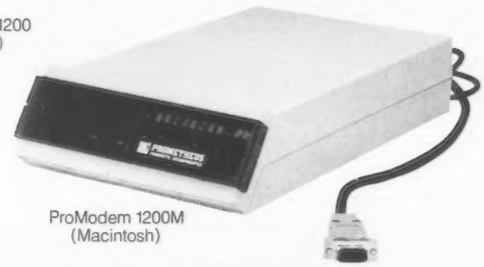
Best estimates are that Apple had delivered 250,000 Apple II computers and 15,000 Macs in France as of May 1985. Most software developers with whom I spoke volunteered that Apple is the most congenial company with which to deal in France. But unfortunately, Apple is an American company, and when the French government sought a computer for its various agencies, it stipulated that it must be French-built. Thus it was that IBM is now the standard in France; well, not IBM per se, but two PC compatibles, one made by Bull and the other by Goupil. Now, of course, everyone seems to be getting on the PC bandwagon. Too bad.

In any event, Apple continues marching to a different drummer and, fortunately, is supported by many active and innovative software developers. For example, Version Soft makes three programs for the Apple II family that make excellent use of the mouse and pull-down menus: *Epistole* (word processor), *Version Calc*, and *Budget Familial* (budget management tool). *Memword* from Memsoft features word hyphenation, imbedded math calculations, and mail-

# ProModem 1200... HOT-LINE

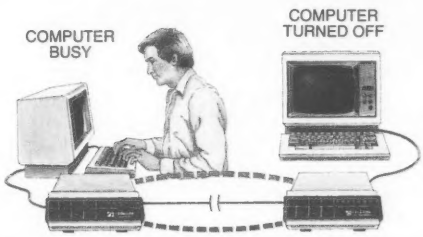
# Our ProModem 1200 Makes Smart Modems Look Dumb

ProModem 1200
(RS-232)



ProModem 1200M
(Macintosh)

## Send Or Receive 50 Pages Of Text Without Tying Up Your Computer




No wonder Smart Modems, Cats, and Maxwells cringe when compared to our $495 ProModem 1200, an expandable 1200/300 baud modem for use with all personal computers. It costs less, but is smarter than the rest.

And when you add our $99 Communications Buffer and Alphanumeric Display options, ProModem 1200 becomes a veritable genius!

Imagine, you unplug your computer, take it home for the weekend, and while you're gone, ProModem 1200 answers the phone, collects messages up to 50 pages long, sends out electronic mail, and displays all events with the exact time of each. Thanks to ProModem 1200, expensive, hard-to-use communications software isn't needed. The communications is in the modem, and electronic mail becomes a background function, where it belongs.

## Simple To Install And Use

Our Communications Buffer is a 4 by 6 card that plugs into the ProModem 1200 motherboard. It comes with 2K of CMOS battery backed-up memory, expandable to 64K. Part of the memory is used as a dialing directory with the balance reserved for storage. For $99 more, a front panel Alphanumeric Display can be added to show time, date, and 24 status and help messages. These two powerful options can be included at time of purchase, or can be added later.

## Hayes Compatible

ProModem 1200 is Hayes compatible but that's where the resemblance ends. Our standard $495 modem includes a real-time clock/calendar. Hayes charges hundreds more for a Smart Modem with a time-base. Nor do they have electronic mail capability at any price.

ProModem 1200 contains a battery backed-up real-time clock/calendar, a large dialing directory and can send or receive messages up to 50 pages long without tying up the computer.

Send for complete details and the name of the Prometheus dealer nearest you.

The Hot Line **PROMETHEUS**
**PRODUCTS INCORPORATED**
4545 Cushing Pkwy. • Fremont CA 94538

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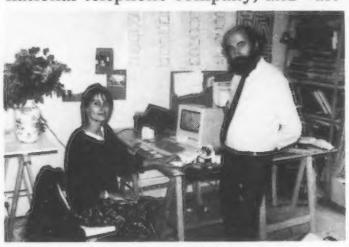
**CIRCLE 144 ON READER SERVICE CARD**

ing list capabilities. *Max the Globe Trotter* from Micro Lingua provides an easy way to learn a foreign language.

Also exciting are the scores of packages for the Mac. At the SICOB show in Paris in May I counted no fewer than 36 new software packages for the Mac ranging from file managers (10) to graphics packages (6) to vertical applications for specific industries (5). Moreover, Lotus was even showing the French version of the long-awaited *Jazz* integrated package.

## Crealude

Pierre Berloquin, a noted designer of pencil-and-paper and board games, turned to computers in 1979 because "they're nicer to work with, and the market is better." He does development work for both institutions (Paris Metro, national telephone company, and various museums) and commercial software publishers.



**Atmosphere is relaxed and informal at Crealude, a software development company founded by Pierre Berloquin (standing).**

I was impressed with *Moderato*, a music composition system for the Apple II family. It employs standard musical notation, is incredibly easy to use, and allows the use of sound effects along with the music.

A brand new product for the Mac is *Fairy Chess* which plays normal chess (with any style chessmen), but also allows the addition of "fairy" pieces at any point in the game. You can edit a piece to look like anything you want and give it a bizarre pattern of movement, or you can use any of the 12 built-in fairy pieces. The game is published by ACI.

## ACT Informatique

In a quaint five-story house at 12 rue de la Montagne Ste. Genevieve, Gerard Dahan has established one of the most successful software development companies in France. Latest product from Gerard's group of 30 is Le Lisp, a fast and powerful dialect of Lisp for the Mac. To accompany Le Lisp, ACT is now working on *AI Kit*, a generator of expert systems for the non-specialist computer user.

ACT has also developed Logo for nine different computers. An interesting add-on package, *Logo Lutins*, permits the user to manipulate up to 32 objects in 16 colors. Dahan feels it is important for Logo users to, as he puts it, "escape from the turtle shell;" thus, he emphasizes output other than turtle graphics.

## Infogrames

Infogrames is the type of hot shot young software company that seemed to epitomize the industry here back in 1981-82. Started just two years ago by Bruno Bonnell and Christopher Sapet, the company employs 30 people today and expects to add 20 more by year's end. In 1984, its arcade/adventure game, *Mandragore*, won first prize in a competition sponsored by the Ministry of Culture.

I was intrigued by Eurospace, a rather serious simulation developed by Infogrames and distributed by VIFI. It makes you the manager of a space shot by the new European space consortium. The mission has four phases: launch, docking with an orbiting space lab, experiments in space, and re-entry and landing. It is highly realistic, and it takes a great deal of practice to complete a mission successfully.

Like most French companies, Infogrames is primarily producing products for France and Belgium although they are beginning to export to non-French speaking countries and are seeking further joint ventures.

## Random Bits

In France, most software is sold through **retail software stores**; mail order is practically non-existent because prices aren't discounted and the mails are slow...The best selling French built home computer with about 40% of the market is the **Thompson** T-07. It uses a 6809 chip, has a cartridge slot, rubberized Chiclet-style keyboard, built-in light pen, and Microsoft Basic . . . **Information networks** are beginning to catch on in France. Calvados, a network for Apple owners has nearly 3000 subscribers.

The May '85 **SICOB show** had 316 exhibitors showing hardware (microcomputers and peripherals) and 226 software publishers. Nearly 150,000 visitors attended the show . . . Many software vendors were showing **vertical applications**. For example, I saw packages aimed at clothing manufacturers, hair dressers, shipping agents, florists, and lawyers . . . Four **multi-user systems** were competing for attention: Concurrent DOS, Unix, Prolog, and Mercure.

And you think they'll really buy it: **Activision's** ad for *The Music Studio* in French magazines shows the opening bars of "The Star Spangled Banner" . . . **MSX** has debuted in France with Sony, Toshiba, Sanyo, Canon, Gold Star, and several others all hitting the market this year with under $350 systems.

**Computer games** are alive and well in France. Loriciels, a two-year old firm, sold 200,000 units last year. Their line includes 96 games for eight computers. I especially liked *Scoop*, an adventure game in which you take the role of a journalist . . . But it sells: the **Alice 90** home computer from Matra comes in a triangular red plastic case with both corners lopped off. The mpu used in the Alice line is a 6803 . . . Even more unusual is the **Excelvision** line of home computers built around an 8-bit TI TMS 7000 chip. They use the same Basic as the TI CC40, but most software comes on tiny plug-in ROM cartridges.

**Jacques Palpacuer, director general of Excelvision shows off the new Excelvision computer at the SICOB show.**

France is the only country I know of in which one of the government agencies responsible for personal computer applications is the **Ministry of Culture**. Acting as a catalyst between software developers and banks (who administer most of the venture capital in France), the Ministry encourages small software firms to pursue a wide variety of innovative projects which they view as a form of modern culture . . . Another more subtle indication that **culture is changing** in France is the fact that the last remaining classical music radio station in Paris changed its format to modern rock in 1984 . . .More next month. ■

# READ ONLY

*A review of the IBM Personal Computer Family. Vol. 2 No. 2*

## WHAT'S THE PROGRAM?

**Meaningful dialogue.** There are two programs from IBM that can greatly improve the quality of our running dialogue with computers. They are the IBM EZ-VU Runtime Facility and the IBM EZ-VU Development Facility.

Think of the EZ-VU Runtime Facility as a mediator in your IBM PC conversations. It handles the exchange of commands and information between you and your application programs through predefined screens. It can give you a single consistent interface with applications written in a variety of languages.

In short, the EZ-VU Runtime Facility lets you concentrate on the essentials of the job you're doing.

If your job is program development, the IBM EZ-VU Development Facility can help you write menu-driven applications—or revise existing ones—that are both sophisticated and easy to use. It incorporates a screen design tool that works through the function keys on your IBM Personal Computer, so there are no special codes and commands to slow down your design work. EZ-VU also helps make fast work of testing and revising your screen designs.

Two additional points. Both of these EZ-VU programs benefit from years of success by similar dialogue management programs in IBM host MVS/VM, and VSE operating environments. And both run under the IBM TopView program, which allows you to run a number of software applications concurrently.

**A quantum leap.** Speaking of technological advances, IBM Personal Computer Professional FORTRAN represents a quantum leap forward in FORTRAN for microcomputers.

It's a full ANSI 77 implementation with enhancements that offers an un-

---

*Application management, program development, and communications software from IBM. See next page for IBM PC Network SNA 3270 Emulation Program story.*

usual combination of speed and accuracy. Optimization techniques and features such as a full symbolic interactive debug facility are similar to those usually found only in IBM VS FORTRAN and other mainframe FORTRAN compilers.

You can use IBM PC Professional FORTRAN to work on large or small host programs and to recompile existing FORTRAN programs—or sections of those programs—to run on your IBM Personal Computer. It's ability to handle arrays larger than 64KB gives you the equivalent of mainframe capability on a personal computer.

And IBM PC Professional FORTRAN was designed for IBM by Ryan-McFarland Corporation to help you take full advantage of other IBM Personal Computer software, such as the IBM Personal Computer Engineering/Scientific Series graphics development tools.

Make that "quantum leaps."

## HARDCOPY

**Hidden talent.** Think of the many entertaining and useful programming ideas that must exist out there but never find their way to market.

The IBM *Directory* of personally developed software gives you direct access to some of that hidden talent. It's a catalog of unique programs developed by individuals for the IBM Personal Computer Family.

Programs listed in the *Directory* sell for as little as $14.95. They cover a wide range of interests, from entertainment and education to personal productivity and business applications.

Each program in the *Directory* has a full description that includes system requirements and illustrations or color photos of representative screens. Programs may be ordered by mail or through a toll-free telephone number.

To subscribe to the *Directory*, call 800-IBM-PCSW.

**The last word.** Or perhaps we should say the last word to date. The new IBM DOS Technical Reference manual contains just about everything you'd want to know about the IBM Disk Operating System Version 3.1 and previous versions 2.1 and 3.0.

That's not to say that new improvements and information won't appear in the future. They will, and you'll be kept abreast of such developments. An update information service is included in the manual's purchase price.

So you'll always have the last word.

*Updated versions of the DOS Technical Reference manual and the Directory of Personally Developed Software from IBM.*

## FAMILY TIES

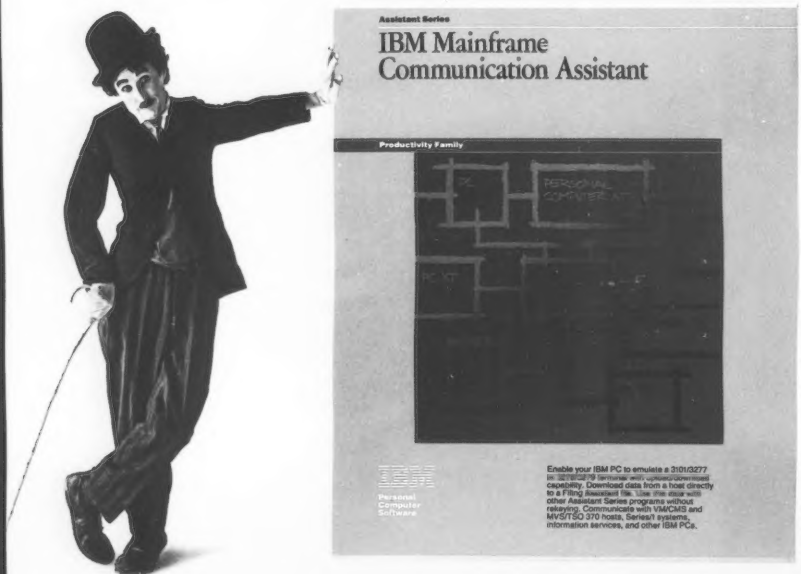
**Close connections.** The IBM PC Family has always included hardware and software to help you keep in close touch with important contacts.

Last year's announcement of the IBM PC Network, for instance, was an important milestone in communications among the immediate family. It gives you an easy way to share information and hardware resources like printers and disk storage devices.

There are two recent IBM communications software products that extend those IBM PC Family connections even further. They make it possible for you to work directly with data stored on an IBM host computer, to communicate from one network to another, and to do an even wider range of your daily business over the IBM PC Network.

**Host communications.** The IBM PC Network SNA 3270 Emulation Program, for example, allows your IBM Personal Computer to communicate with an IBM host system through telecommunications lines.

*Broaden your IBM PC connections with communications software from IBM.*


Assistant Series
IBM Mainframe
Communication Assistant
Productivity Family
Personal
Computer
Software
Enable your IBM PC to emulate a 3101/3277
capability. Download data from a host directly
to a Filing Assistant file. Use this data with
other Assistant Series programs without
rekeying. Communicate with VM/CMS and
MVS/TSO 370 hosts, Series/1 systems,
information services, and other IBM PCs.

You then have direct access to the data and programs on the host computer. So if you're working on a branch-office quarterly report, you no longer have to wait while essential data from a headquarter's computer is sent to you and copied for your use. There's also a redirector function that allows you to place the data on a file server for distribution to other stations on your IBM PC Network.

In addition, when the program is installed on an IBM Personal Computer in an IBM PC Network, that PC can act as a communications gateway for other members of the same network. If members of a network need to communicate with more than one IBM host computer—or with different applications on the same host—multiple gateways can be attached to a single IBM PC Network.

And an IBM PC with the IBM PC Network SNA 3270 Emulation Program installed can still be used as a network station doing standard PC work.

You could, for instance, use your IBM PC to create a data set on a host system. You could also create a word processing project on your IBM PC using DisplayWrite 3* switching easily back and forth between them without terminating either session. The IBM PC Network SNA 3270 Emulation Program also allows you to transfer graphics printing jobs from the host to an IBM PC with a graphics printer attached.

**Stand-alone assistance.** There's a new addition to the IBM Assistant Series to help handle stand-alone communications between your IBM Personal Computer and a host machine or another IBM Personal Computer. IBM Mainframe Communication Assistant software includes a 3101 and 3270/78/79 terminal emulator for your IBM PC, plus a set of host computer support programs for VM/CMS and MVS/TSO systems.

Mainframe Communication Assistant has the same easy menu structure as other members of the Assistant Series, such as Writing Assistant and Planning Assistant. And it offers a number of unusual features to simplify your communications work.

It can, of course, speedily transfer files between host and PC (or PC and PC). After you've worked with the host file, Mainframe Communication Assistant lets you transfer only the changes you've made—rather than the entire file—back to the host computer.

And, as a member of the Assistant Series, Mainframe Communication Assistant allows you to integrate mainframe database information into Filing Assistant files. You're then able to transfer that information to other members of the Assistant Series, saving the time and effort of reentering data that has been stored on a mainframe computer.

*IBM Quietwriter® Printer offers advanced printer technology and unusually low operating noise level. Shown with sample of letter-quality printing.*

*Follow the proper installation instructions in the IBM PC Network 3270 Emulation Program documentation for DisplayWrite 3.

## HARDWARE NEWS

**Quiet, please.** There's been a quiet revolution in printer technology. The IBM Quietwriter® Printer is as advanced as the computers it serves. It's versatile, compact, remarkably quiet, and produces work that might make people think you've got a printing press in the back room.

In this case, the spark behind the revolution is a new method of resistive ribbon, non-impact printing developed by IBM. The "Quietwriter" Printer replaces print elements or hammers that strike the page with a unique multi-layer ribbon and print mechanism that virtually "paints" characters on the paper.

As a result, the "Quietwriter" Printer produces superb, letter-quality printing on a variety of papers and in a wide range of type styles. To change type styles you just unplug one font module and plug in another. And because the "Quietwriter" Printer can accommodate two font modules, you can have two type styles online at once.

The "Quietwriter" Printer also allows you to produce a wide array of character graphics either separately or to highlight reports and correspondence.

And it does all of this very, very quietly. At 50 dB, the IBM "Quietwriter" Printer* makes less noise while printing than many printers make while idling. That means you can put the "Quietwriter" Printer wherever it's most convenient: it won't disturb either your telephone conversations or your train of thought.

**Unconventional ability.** IBM also makes conventional printer technology seem anything but conventional.

Consider the IBM Wheelprinter,* for example. Its printwheel is designed to provide sharp, clear letter-quality printing even after millions of impressions. And the printwheel is easy to change, which is important because there's a selection of over 500 printwheels to choose from. The Wheelprinter's standard features also include both automatic sheet feed and continuous forms feed—optional on many other printers.

The Wheelprinter is reliable enough to take on high-volume office work. It even works with two types of ribbons to suit the requirements of different types of jobs. There's a single-strike ribbon for finished reports or correspondence. For more routine jobs like purchase orders or internal memos, you can use a longer lasting, lower cost multi-strike ribbon.

The Wheelprinter has equally impressive qualifications as a home printer. To begin with, it's remarkably easy to use. The Wheelprinter's integrated paper path provides reliable cut-sheet printing and allows it to do much faster work than you might expect from a 25cps printer. And its acoustically engineered cover makes the Wheelprinter an exceptionally quiet impact printer.

Maybe "conventional" isn't the right word at all.

*These are just two of the various printers available from IBM for the IBM Personal Computer Family.

## ON THE STOREFRONT

**Extra attention.** Even the best equipment sometimes needs a little extra attention. An IBM Dealer Service Option can provide it. It gives you extended service coverage for IBM Personal Computer products, and is available from participating Authorized IBM Personal Computer Dealers either before or after your original warranty expires.

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In addition to sparing you the complications of arranging for the job to be done after something has gone wrong, a Dealer Service Option assures you of first-rate work. IBM Personal Computer Dealers have full-time, IBM-trained and authorized technicians on staff as well as direct access to IBM technical experts who can help with unusual or complex questions.

An IBM Dealer Service Option also covers a couple of important additional contingencies. If you move, your service coverage can be honored by a participating Authorized IBM Personal Computer Dealer in your new location. And if you should decide to sell your IBM Personal Computer product, your Dealer Service Option may be transferred to the new owner.

IBM®

## TIPS AND TECHNIQUES

**Stop action.** If you occasionally sit frozen while screen after screen of information rolls by too fast to read, take heart. There's more than one way to stop that cascade of data and view one screenful at a time.

When listing the directory of a diskette or fixed disk, the command DIR/P will do the trick. After finishing with one screen, press any key to bring up the next.

To slow down the listing of a text file, you could use the CTL/NUM LOCK keys, but that involves keeping both hands on the keyboard and an eye on the screen.

Instead, check your DOS directory listing to make sure the DOS utility program MORE.COM is available. Then, at the DOS prompt A>, type the command line MORE<filename and press enter.

NOTE: be careful to use "<" and not ">"; if you enter the wrong one, you'll destroy your text file.

To view a file called PC-WRITE.DOC, for example, enter MORE<PC WRITE.DOC. That will list a single page of text on your screen and display the message —MORE—. Again, press any key to view next screen.

Voilá, perfect control.

Thanks for this tip to Chuck Harrington of the Athens, Ohio, area IBM PC Users Club.

Thanks also—and apologies for omitting a note of credit in the last issue of *Read Only*—to Ed Smuckler of the Redondo Beach, California, Greater South Bay User Group for his tip about setting screen colors.

For more information about IBM Personal Computer products discussed in this issue of *Read Only*, see your Authorized IBM Personal Computer Dealer or IBM Product Center. To learn where, call **800-447-4700.** In Alaska and Hawaii **800-447-0890.**

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# BOOK REVIEWS

## Robots, Assembly, and other languages

**Russ Lockwood**

**Local Area Networks: An Introduction to the Technology** by John E. McNamara. Digital Press, 30 North Ave., Burlington, MA 01803. Softcover, 165 pages, $28

The local area network (LAN) market is booming as more and more companies discover the convenience of linking microcomputers together. However, the road to productivity riches traverses difficult ground, and DP/MIS managers may find themselves lost amidst technical sales hype.

Enter *Local Area Networks*, the book. This introductory text presents the concepts behind LANs without overwhelming the reader with technical specifications and equations. It provides an overview of how LANs share programs and peripherals and covers such topics as cost effectiveness, installation, operation, expansion, and maintenance.

John E. McNamara, a consulting engineer for Digital Equipment Corp., brings order to the complex subject of LANs. His clear writing style and obvious expertise make *Local Area Networks* a must-read book for the manager in search of a LAN.

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**Commodore 64 Micro Mansion** by David B. Bonynge. Tab Books, Blue Ridge Summit, 17214. Softcover, 192 pages, $11.45

David B. Bonynge explains how to use your Commodore 64 to control lighting, heating, cooling, security, and other electrical systems in and around your home. He discusses the equipment you need, explains installation procedures, and describes how to operate the system.

In theory, the idea of computerized home control captures our fancy. In practice, we may find that ideal control entails a lot of practical time and effort.

Indeed, the instructions seem straightforward enough. However, after reading that "Lisa and Fred" took three weeks to complete "much of the wiring," used crawl spaces and laundry chutes, and then spent at least an entire weekend installing the real hardware, we start to wonder.

If computerized home control appeals to you and you possess some electrical aptitude, take a close look at *Commodore 64 Micro Mansion*. The idea is viable, the potential for saving enormous, and the book is interesting and informative. Versions are also available for the Apple II and the IBM PC.

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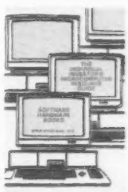
**The Individual Investor's Microcomputer Resource Guide** by Norm Nicholson. Investment Information Services Press, 205 W. Wacker Dr., Chicago, IL 60606. Softcover, 194 pages, $11.95



Norm Nicholson, editor of "Computerized Investing" newsletter and associate professor of finance at DePaul University, describes the hardware, software, and telecommunications services available to the investor.

The hardware section is short and weak, with a cursory description of microcomputers and the advice to buy the Commodore 64 (low end), Apple II (medium-priced), or IBM PC (high end). Fortunately, the software section is more helpful and consists of capsule descriptions of about 250 packages.

The last section holds short descriptions of 26 telecommunications services that offer investment information.

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**The Eudaemonic Pie** by Thomas A. Bass. Houghton Mifflin. Hardcover, 324 pages, $15.95

This potentially interesting book tries to emulate Tracy Kidder's *Soul of a New Machine* but never achieves the same passion or quality. It traces the efforts of a bizarre group of physicists and electronics wizards as they try to build a miniature computer that predicts where a ball will land on a roulette wheel. The idea is to clean up in Las Vegas and divvy up the profits.

However, too many tangents mar and obscure the narrative, plaguing an otherwise interesting story with repeated slow passages. Even worse, the ending is downright disappointing: the merry band cleaned up statistically, but technical difficulties prevented them from raking in the chips.

*The Eudaemonics Pie*, named after a "rational spirit" in Aristotelian philosophy, can be cut into thirds: one-third exciting, one-third dull and boring, and one-third somewhere in between.

---

**Programming Languages: Featuring the IBM PC and Compatibles** by Marc Steigler and Bob Hansen. Baen Enterprises, 8 W. 36th St., New York, NY 10018. Softcover, 443 pages, $9.95

This comprehensive guide to the major microcomputer programming languages holds a cornucopia of information. It dissects 13 languages—Basic, Fortran, C, Cobol, RatBas, Pascal, Modula 2, Ada, APL, Forth, Lisp, dBase II, and Assembly—and points out the strengths and weaknesses of each.

Steigler and Hansen use the same format and criteria to evaluate each language. They start with the history of a language, delve into its features, discuss the type of application best suited to it, provide references, and finish with a listing of a program called Racetrack. They concentrate on program complexity, modularization, abstraction, and general problems associated with large programs. Throughout, the emphasis is on what makes a language unique and how a particular language matches up with your application requirements.

Although geared for the IBM PC, the same fundamental ideas and features carry over to other computers as well. For the programmer in search of a programming language, we can think of no better title to recommend than *Programming Languages*.

# BOOK BRIEFS

## Assembly

**Assembly Cookbook for the Apple II/IIe** by Don Lancaster. Howard Sams & Co., 4300 W. 62nd St., Indianapolis, IN 46268. Softcover, 408 pages, $21.95

Apple II guru Lancaster delves into the EDASM macroassembler from Apple Computer. The book includes nine program modules, covers source code details, and offers a wide range of programming tips, tricks, and techniques.

**Fundamentals of IBM PC Assembly Language** by Al Schneider. Tab Books, Blue Ridge Summit, PA 17214. Softcover, 308 pages, $15.50

This information-packed book brings assembly language within the grasp of novice and veteran programmers. It includes a multitude of examples, sample programs, and illustrations.

**Assembly Language Made Easy for the TRS-80** by Chao Chien. Holt Rinehart and Winston. Softcover, 228 pages, $18.45

This book is for veteran TRS-80 programmers who want to learn assembly.

**Learning Assembly Language: A Guide for Basic Programmers** by Hugo T. Jackson and A. M. Fischer. Harper & Row. Softcover, 306 pages, $19.95

Designed for beginning programmers, hobbyists, and students, this book presents the fundamentals of assembly language programming without a machine-specific orientation.

**Fundamentals of TI 99/4a Assembly Language** by M. S. Morley. Tab Books. Softcover, 310 pages, $11.50

This book is for hardcore TI 99/4a users who want to learn assembly.

**From Basic to 8086/8088 Assembly Language** by Harley Templeton. Wordware Publishing, P.O. Box 1747, Plano, TX 75074. Softcover, 181 pages, $17.95

For programmers who want to convert Basic programs into assembly language code.

**8086/8088 Assembly Language Programming** by Bik Chung Yeung. John Wiley & Sons. Softcover, 265 pages, $19.95

Dry reference work for advanced programmers is based on the ACT series computers.

**Using the IBM PC: Organization and Assembly Language Programming** by Mark Franklin. CBS Computer Books, 383 Madison Ave., New York, NY 10017. Softcover, 357 pages, $20.45

This guidebook to assembly language on the IBM PC is geared for programming professionals.

## Robots

**A Robot in Every Home** by Mike Higgins. Kensington Publishing, 6300 Telegraph Ave., Oakland, CA 94609. Softcover, 191 pages, $14.95

Mike Higgins, editor of *Personal Robotics News* newsletter, provides an excellent general introduction and buyer's guide to home robots. He traces the history of robots, introduces the major players, points out the practical and frivolous uses of robots, and includes an extensive reference section.

**Probots & People** by Timothy O. Knight. McGraw-Hill. Softcover, 126 pages, $9.95

This shallow introduction to home robots hypes public relations material.

**Introduction to Robotics** by James Rehg. Prentice-Hall. Hardcover, 230 pages, $29.95

This textbook introduction to industrial robotics covers everything from systems to nuts.

**Robotics and Artificial Intelligence** edited by M. Brady, L. A. Gerhardt, and H. F. Davidson. Springer-Verlag, 175 Fifth Ave., New York, NY 10010. Hardcover, 693 pages, $62.50

This massive volume, actually a collection of research papers published in conjunction with the North Atlantic Treaty Organization (NATO) Scientific Affairs Division, provides a comprehensive overview of robotics and artificial intelligence. For the heavyweight scientific community, the information within is well worth the steep price.

## Other Languages

**Computer Programming in Fortran The Easy Way** by Lawrence S. Leff and Arlene Podos. Barron's, 113 Crossways Park Dr., Woodbury, NY 11797. Softcover, 326 pages, $8.95

The book comes with a guarantee: "This book will improve your grades in 30 days or you can return it to Barron's for a full refund." Other titles in the series teach Basic, Cobol, and Pascal.

**Lisp: A Gentle Introduction to Symbolic Computation** by David S. Touretzky. Harper & Row. Softcover, 384 pages, $18.95

This introduction to Lisp, the preferred programming language of artificial intelligence researchers, is based on MacLisp and Common Lisp.

**Understanding Ada** by Ken Shumate. Harper & Row. Softcover, 387 pages, $18.95

This book introduces the major features of Ada, the programming language of the U.S. Department of Defense. It incorporates the new ANSI standards and includes examples and sample programs.

**C Language for Programmers** by Kenneth Pugh. Scott, Foresman and Company. Softcover, 198 pages, $17.95

Dry introductory text helps experienced programmers learn C by building on previous programming knowledge.

**Practical Programming in Pascal** by Kent Porter. New American Library, 1633 Broadway, New York, NY 10019. Softcover, 266 pages, $14.95

This book teaches beginners to write Pascal programs.

**Mastering Forth** by Anita Anderson and Martin Tracy. Brady Communications, Bowie, MD 20715. Softcover, 220 pages, $14.95

This step-by-step tutorial teaches the commands used in Forth-83.

**IBM PC Cobol** by William J. Atkinson, Jr. and Paul A. DeSanctis. Reston Publishing, Reston, VA 22090.

This introductory guide to programming Cobol on the IBM PC is based on Microsoft Cobol-80 and Micro Focus CIS Cobol.

**Role of Honor** by John Gardner. Berkeley Books, paperback, 304 pages, $3.95

"James Bond could not take his eyes from the soft curl of hair on an almost exposed shoulder." Yet in 27 days, the lady makes Bond a world class programmer in Basic, machine code, Cobol, Pascal, and Forth which he uses to save the free world from a band of baddies. Absurd, but good fun as usual.—*DHA*

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# RECREATIONAL COMPUTING

## The palindromic number conjecture: Don't try this!/Michael W. Ecker, Ph.D.

Greetings again everybody! This month—despite the teaser of a title—I have an interesting and intriguing conjecture for you to experiment with. I will also offer a solution to last month's challenge as well.

Let's get started with the palindromic number conjecture. A palindrome is an expression—literal or numerical—which reads the same backwards as forwards, as in "Madam I'm Adam" and 12321. These symmetric symbolisms are of only occasional serious use, but are inherently engaging nonetheless. Indeed, there is even a famous unsolved mathematical conjecture dealing with them. It goes something like this:

Suppose you start with a positive integer. Let's think of 782. Form the reversal of it: 287 in this case. Now add the two numbers: 782 + 287 = 1069. If this number is not a palindrome, then repeat with this number: 1069 + 9601 = 10670. And so on. I'll leave you to continue with that one.

If we start with 48, we have 48 + 84 = 132; 132 + 231 = 363, a palindrome. The question is: Is it true that no matter which number we start with, the process must eventually yield a palindrome?

You will notice that when there are no carries in the addition, as in 132 + 231, it is automatic that the result is a palindrome. Also note that if you experiment with large numbers, the sums that fail to be palindromic generally come close in the sense that symmetrically located digits are usually very close (e.g., 7 and 8). Do you think that a palindrome is inevitable?

This problem has defied an elegant solution, although much is known about specifics using computers. This problem has also been dubbed the "196 problem" since nobody has ever been able to start with 196 in this process and get it to terminate. When I advised you not to try this, I had this in mind. Although I am not very sanguine about the prospects for one of us to make any research breakthroughs, I think you might find it an interesting programming challenge with many possible approaches. Can you write a program to implement the process described above? This one could get into precision questions and/or string variables, so I anticipate great variety. If you have a nice solution, please send it to me at the address below.

Dr. Michael W. Ecker is Associate Professor of Mathematics and Computer Science at the University of Scranton, PA.

```
5  ' Program to print itself
10 DIM S$(14)
11 S$( 1 )=" 5  ' Program to print itself"
12 S$( 2 )=" 10 DIM S$(14)"
13 S$( 3 )="S$("
14 S$( 4 )=")="
15 S$( 5 )=" 101 Q$=CHR$(34): ' Quotation sign"
16 S$( 6 )=" 102 PRINT S$(1)"
17 S$( 7 )=" 103 PRINT S$(2)"
18 S$( 8 )=" 104 FOR I=1 TO 14"
19 S$( 9 )=" 105 PRINT 10+I;S$(3);I;S$(4);Q$;S$(I);Q$"
20 S$( 10 )=" 106 NEXT I"
21 S$( 11 )=" 107 FOR I=5 TO 14"
22 S$( 12 )=" 108 PRINT S$(I)"
23 S$( 13 )=" 109 NEXT I"
24 S$( 14 )=" 110 END"
101 Q$=CHR$(34): ' Quotation sign
102 PRINT S$(1)
103 PRINT S$(2)
104 FOR I=1 TO 14
105 PRINT 10+I;S$(3);I;S$(4);Q$;S$(I);Q$
106 NEXT I
107 FOR I=5 TO 14
108 PRINT S$(I)
109 NEXT I
110 END
```

**Listing 1. Andrew Bulfer's self-listing program. Spaces are crucial for the program to run correctly (see text).**

### And Collatz, Too

Another famous conjecture whose solution has evaded solution is the famed Collatz conjecture. I mention it here to give something to do to those of you who may find the first question too involved. It goes like this: Take any positive integer. If even, divide it by 2. If odd, triple and add 1. Repeat. Must you always eventually hit the number 1 in the process? For example, if you start with 15, you get 46, then 23, then 70, followed by these: 35, 106, 53, 160, 80, 40, 20, 10, 5, 16, 8, 4, 2, 1—success. If we continued, we would get 4, 2, 1, 4, 2, 1, . . . so there is no point in going on. You might enjoy exploring this question further with your own program.

### Solution to Self-Listing Program

In June, I challenged you to write a program which, when run, would list itself—without using the LIST command in the program. A person looking at your screen should be unable to tell whether you had just typed LIST or RUN. Here is the solution as provided by Andrew Bulfer and modified by me to work as well as can be expected in Microsoft Basic. See Listing 1.

I should point out that, very strictly speaking, this solution is slightly rigged because Microsoft Basic inserts an additional space in front of numbers. If you have an Apple, the spaces should not be included around the S$ subscripts or in front of the line numbers (the first characters of each string) in Lines 11 to 24.

Time to go again. I invite everybody to try the challenges, come up with your own solutions, and your own problems as well. They should be recreational in nature. Digit delving and other forms of microcomputer mathemagic in Basic are what I have foremost in mind, but I want to hear from you. Your ideas, if used, will be acknowledged in this column. I solicit your new problems, programs, improved solutions, etc. I will also answer readers who have pertinent questions and who supply an SASE (that's self-addressed stamped envelope). You may write to me directly: Dr. Michael W. Ecker, Contributing Editor, Creative Computing, 129 Carol Dr., Clarks Summit, PA 18411. ■

# "Thanks for the memory."

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# TELETALK

## Are you a candidate for telecommuting?

**Corey Sandler**

I hate going to the office—it always gets in the way when I have work to do. First there is the alarm chirping at an ungodly hour, robbing me of needed sleep; then there is the wasted effort of joining the briefcase brigade on the commuter train (the one with the reliably unreliable schedule), and finally there is the office itself with its continual interruptions: coffee breaks, elevator waits, baseball pools, pointless meetings, and idle chitchat.

And what do I do when I make it to my desk? I sit down in front of a personal computer and spend the day sending and receiving electronic mail, researching stories from electronic databases, calling people on the telephone, and writing. The number of face-to-face meetings I absolutely must attend are quite limited.

Why, then, you may ask, don't I telecommute? (That was your question, wasn't it?) The answer, I'm afraid, is more societal than technical: the day of the full arrival of the telecommuter is being delayed by a number of not-insignificant details, none of which has much to do with the essential mechanics of the task.

Telecommuting is the electronic recognition of the fact that for many jobs it is the performance of the task that is important, rather than the physical presence of the worker. If your job is to guide the operations of a drill press, or to deliver a Big Mac from the grill to the customer's hands, then until you are replaced by a robot, you are not a candidate for telecommuting. If, on the other hand, you are in charge of manipulating electronic data—be it as a word processor, a database manager, or an accounts payable clerk—you are a servant of the information age. Where you do your work is of secondary importance to the job to be done.

It is the telecommunication link—through a leased telephone line, a direct modem-to-modem link, or an indirect connection through the services of a value-added network—that makes telecommuting possible. For example, I now send three-quarters of my magazine articles, letters, and memos via electronic mail. I do most of my research on-line, either by consulting one of the many electronic database services, or with a direct micro to mainframe link. The rest of my time is generally spent on the telephone, and the people I'm speaking with don't know whether I am in a plush Park Avenue office or in my spare bedroom at home.

**If Willie manages a production/sales spreadsheet from home while Janice does the identical job in the office, should they be paid the same?**

How big is this a potential stay-at-home workforce? Some studies say that 50 to 55% of the American workforce shuffles information for a living. A telecommuting specialist says that by 1990 more than 10 million Americans will leave the driving to others and plug in from home. Futurist Alvin Toffler puts the number even higher—15 million by the end of this decade.

But today? The most optimistic estimate is that some 40,000 persons now telecommute—doing jobs at home that ordinarily would be performed in the office. Many of those workers are supported by the 400 or so companies that have official policies allowing or even encouraging the practice. There are also a fair number of workers who can honestly declare that they will stay home on occasion to get a report done, or to answer the mail.

But as you can surely see, there is a long distance between 40,000 telecommuters today and 10 million five years from now. Here are some of the issues and prejudices yet to be resolved:

### The Nose-Counting Syndrome

I once worked for a boss who ran his operation as if he were the coxswain on a slave galleyship. He had turned his desk around so that it faced the plate glass window that ran the width of his office, and he sat there all day watching. All of our desks were turned to face his. If one of us lifted our eyes from the desktop to think, we would meet his disapproving gaze. We soon perfected inventive techniques to look busy, even at the cost of real productivity. This man, who showed no real understanding of or interest in the work we were performing, was a supervisor who managed activity rather than results.

I can't imagine such a supervisor accepting the redeployment of his troops to their homes without the installation of television cameras and time clocks in the family den. His personal definition of power included the ability to point to the straining oarspeople under his command.

And, some workers might not be suited to working at home. It takes a certain sort of self-motivated person to be able to get out of bed and into the den or home office each day without a nose-counter watching. And there are distractions like television sets, children, refrigerators, day ball games, and warm beds.

Finally, home workers may have to deal with the possibility that out of sight means out of mind when it comes to such things as promotions, new projects, and raises. At the same time, the home worker is somewhat insulated from office politics.

### The Sweat Shop Ethic

If Willie manages a production/sales spreadsheet from home while Janice does the identical job in the office, should they be paid the same? Should

Willie receive full benefits? Should Janice be paid a bonus for her time, effort, and expense in commuting to work? Should the company subsidize Willie's electric bill at home? How about Janice's subway tokens? Should Willie have the right to join a union?

And then there are some questions of fair labor practice, an issue of particular importance where people are being paid on a piecework basis to perform tasks like entering health claim forms into a computer or conducting telephone surveys or entering text into a database. There are well-intentioned laws that are supposed to guard against employer abuse in such things as the number of hours of work per week, the working conditions themselves, and child labor regulations. How can these conditions be monitored from afar?

The basic federal law here dates back nearly half a century to the Fair Labor Standards Act of 1938. Under that law, and regulations promulgated by the Labor Department in 1943, seven industries—knitted outerwear, women's garments, embroidery, handkerchiefs, jewelry, buttons and buckles, and gloves and mittens—cannot be farmed out by a company to workers at home. The intent, aided by pressure from unions seeking to hold onto jobs and membership, was to make certain that home workers received wages no less than the minimum wage and to ensure conditions were no worse at home than they were at the work place.

Now, some unions are pressuring federal and state governments to either ban outright or strictly regulate telecommuters.

### Security Issues

Is it a wise move to allow sensitive corporate data out of the office, whether that information is conveyed electronically via a modem or on a disk or tape, or whether papers are shipped to and from home workers? And who is liable for the security of that information—the employer or the employee?

The ownership of the equipment itself is another issue. If the PC or terminal is owned by the employee, then some sort of compensation should be made by the employer. If the equipment is provided to the home worker by the company, the situation is simpler, unless that worker allows his 10-year-old to play *PacMan* or his wife to run a freelance accounting business on weekends. The IRS might want to charge the worker for additional benefits.

### The Show-Me-the-Bottom-Line Syndrome

In the end, the real determiner of the success or failure of the telecommuting revolution will be the bottom line. If companies can be shown that they will save on office space, energy costs, and other fixed expense, they will take notice. If they can also save on salaries, benefits, and at the same time pick up some productivity, they will appreciate that, too.

And wait—it gets better: let's suppose the government will give the employer tax credits or direct grants for training and employment of the handicapped or the homebound. And how about incentives to hire mothers with young children at home? It is, on the face of it, a wonderful idea that can recapture the productive brains of otherwise unemployable human beings. Ah, but let's ask a few real world questions: will this mean the loss of jobs for the able-bodied? Will it mean that the home worker will be paid substantially less than the office worker? Will all wages decline as a result?

### The "Daddy Doesn't Work Anymore" Syndrome

How do you explain to the neighbors that you don't go to Wall Street anymore, but you are still gainfully employed? The still-developing lore of telecommuting includes the story of a man who insists on dressing in a three-piece business suit each morning before heading down the hall to his den where he sometimes plays a tape of the sounds of his former office.

When I told my loving wife I was considering working full-time from my office at home, her eyes glazed over. "You're going to have to rent an office a few blocks from here anyhow," she said sweetly.

"But, I won't need to get out of the house," I replied.

"No," she answered, "you might not, but I will."

### Telecommunications Bits

The State University of New York has formed a Telecommunications Institute that will offer degrees in electronic information, including a bachelor of science degree in telecommunications. Courses will include the history of telecommunications in the telephone industry, voice and data communications, transmission theory, principles of switching, and terminal equipment and network design.

The institute, at the new Marcy campus of the State College of Technology at Utica-Rome in upstate New York, is a joint venture with Nynex Business Information Systems Co., a subsidiary of what used to be AT&T's New York Telephone Co.

"The industry tells us that there is a need for 100,000 people with training nationwide," says James Countryman, vice president for academic and student affairs of the college.

I can hear the latest pep rally chant now: "2-4-6-8, Time to Tella-communeacate!" ■

*"Your computer's calling, Ed . . . it wants to know if you're coming home soon!"*

Low cost mass storage has hit town with faster speed and greater capacity/**Joe Desposito**

# INVASION OF THE HARD DISK DRIVES

If Simon and Garfunkel were to sing about hard disks, they might use the lyric "Where have you gone, five megabytes?" Though this was a popular storage capacity a few years ago, 5Mb hard disk drives have all but vanished from the marketplace. Ironically, though storage capacity has increased, price has not—it has decreased dramatically. Nowadays a 10Mb drive can be purchased by mail order for under $700, complete with controller and software. We are certainly getting more bytes for fewer bucks. But what other changes are occurring in hard disks?

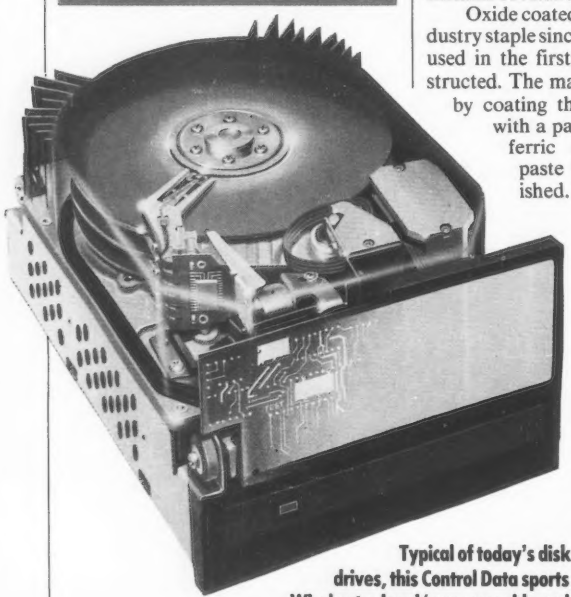
Like most products associated with electronics, hard disks are shrinking in size. Half-height 5.25″ drives are common, while drives with 3.5″ platters are gaining in popularity. Speed is a critical issue, so some hard drives are significantly faster than others. Another issue is the disk medium itself. Should it be oxide coated, plated, or something else? Should it be fixed inside the drive or removable?

Since hard disk drives are sealed in an enclosure, it is difficult to ascertain the features of a particular drive. Let's examine current hard disk technology to gain a better understanding of what goes on inside this popular storage device.

## The Media Stores the Message

The term "hard disk" derives from the rigid platter that resides inside the drive. A typical hard disk drive may contain one or more of these platters. The bare disk, or substrate, is made of aluminum, which is then covered with a metallic substance.

Oxide coated disks have been an industry staple since 1955, when they were used in the first disk drives ever constructed. The magnetic layer is created by coating the aluminum substrate with a paste containing gamma-ferric oxide particles. This paste is then cured and polished. Next a protective lubricant is added, and the layer is burnished smooth. Each particle in the magnetic layer can be polarized by the read/write head to represent data.



**Typical of today's disk drives, this Control Data sports Winchester head/arm assembly and multiple oxide coated platters. Such 5¼″ oxide disks (seen at left of formation on opposite page) gained wider acceptance than 5¼″ plated disks (rear), but 3½″ sputtered disks (top) appear to be the wave of the future.**

Another category of media that has been around for some time is metallic thin-film plated disks. This kind of disk is manufactured by immersing aluminum substrates in a series of chemical plating baths, coating the substrate with layers of metallic film. The last layer is a very thin (three microinch) cobalt alloy in which the magnetic transitions are stored.

A newer kind of medium is metallic thin-film sputtered disks. These are manufactured by coating the aluminum substrate with a nickel phosphorus layer, which is smoothed and polished. Then a continuous vacuum deposition process called sputtering is begun. In this process, magnetic layers as thin as two microinches are deposited on the disk similar to the way wafers are coated with thin metallic films in the semiconductor industry. The sputtering technique is then used to lay down a diamond hard one-microinch protective carbon overcoat.

So why the discussion of media? Why should you care if your hard drive has oxide coated, plated, or sputtered disks? The answer is the difference between a 5Mb and a 20Mb drive—storage capacity.

In a hard disk drive the read/write head(s) doesn't touch the disk, but flies over the surface as close to it as possible. If the head were to come in contact with the surface of a disk while it was spinning, a head "crash" would result and data would be lost.

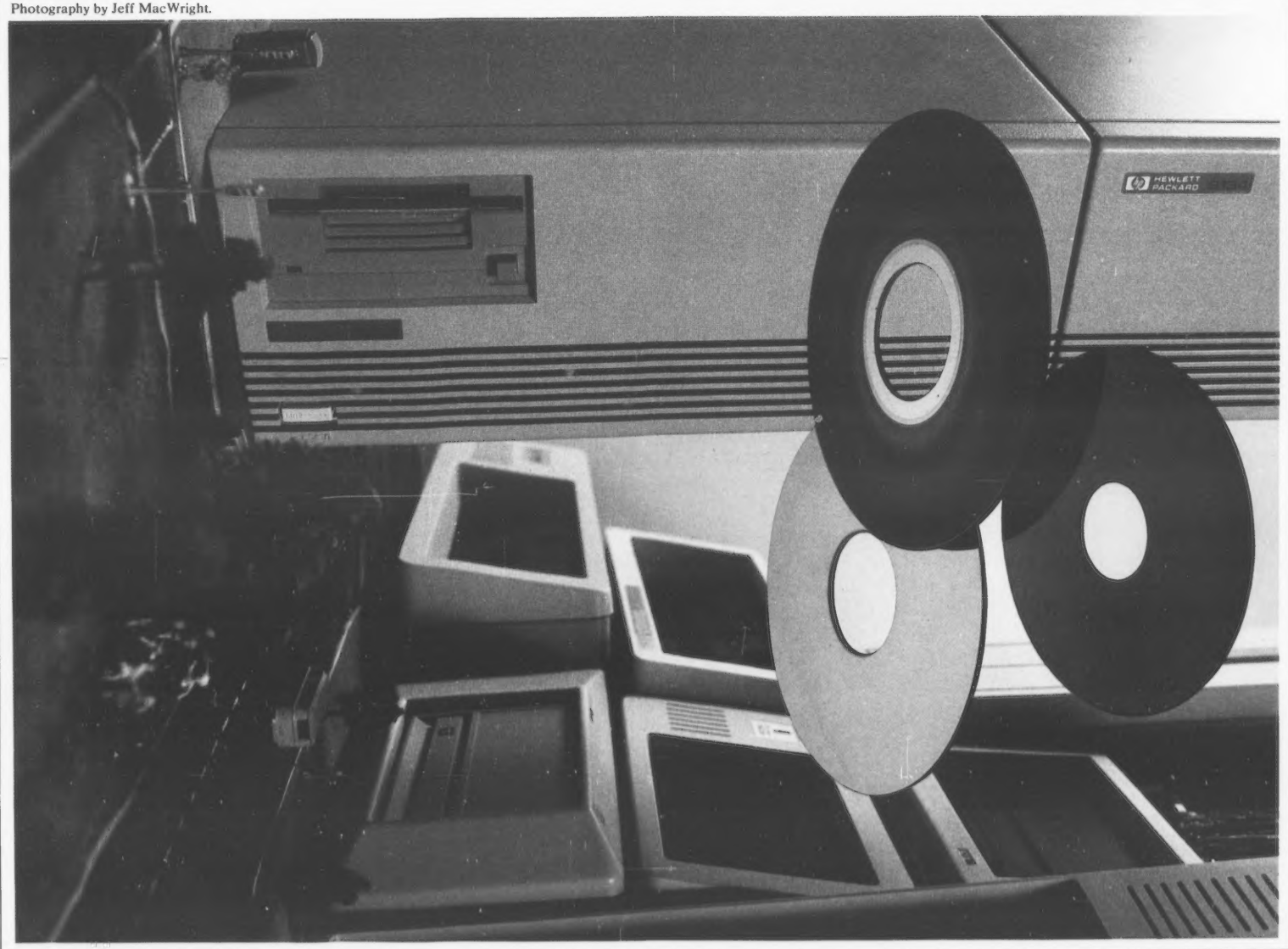
As the flying height of the head decreases, the storage capacity of the disk increases. But since we are talking about flying heights in the microinch range, the smoothness of the surface of the disk also becomes critically important.

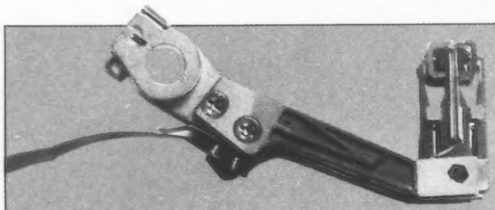
Though the surfaces of oxide-coated and plated disks appear smooth to the naked eye, under an electron microscope hills and valleys appear. Here sputtered disks have an edge. The disk surface of a sputtered disk is so smooth that heads can fly reliably just eight microinches above the surface.

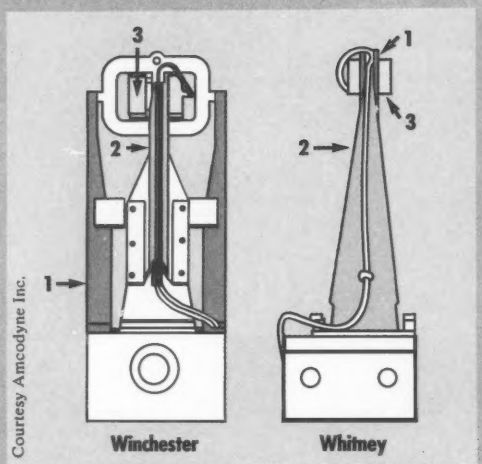
Another factor influencing capacity is the thinness of the magnetic layer placed on the disk. Both metallic plated and sputtered disks have magnetic layers as thin as two microinches; oxide-coated disks, on the other hand, have magnetic layers that are typically 30 microinches thick.

Another advantage of plated and sputtered media is that the intensity of

Photography by Jeff MacWright.








Courtesy Amcodyne Inc.

**Figure 1. Winchester's head/arm assembly is pictured at left and its elements are compared in size and geometry with those of the Whitney arm assembly (diagrams at lower left): Side rails (1), load beam (2), and slider (3). Below: Tandon's half height TM 775 Winchester disk drive stores up to 51 Mb on three plated disks. Note the use of a Whitney head/arm assembly.**

the magnetic field at any given point is almost twice that of oxide-coated media. This provides the higher signal amplitudes needed for good signal-to-noise performance, which in turn increase the capacity of the disk.

One of the manufacturers of plated media, the Tandon Corporation, has come up with a new technique, which consists of depositing a protective overcoat layer on top of electrolytically plated cobalt layers with the sputtering process. The sputtered overcoat of carbon provides strength, smoothness, and integrity to the plated disks.

Why, you might ask, is oxide-coated material used at all if plated and sputtered disks seem to be so superior? One reason is that the oxide-coated disk has been old reliable for many years. Another is the cost factor. Oxide-coated disks are much easier to mass produce and thus can be sold much more cheaply. Which type of media do you think resides in a $699 10Mb drive?

## The Head Bone Connects to the Arm Bone

Disks store your data, but it is the read/write heads that transfer the data from the disk to the drive electronics. And it is the arms that hold the heads as they move from track to track.

The conventional head in a hard drive is a ferrite head. However, a more advanced head technology is a tiny electromagnet called a thin-film head. Thin-film heads can read and write information in denser patterns on a disk, which means that more information can be put on a disk. Besides higher recording densities, thin-film heads tend to be more reliable and lighter than ferrite heads. But cost again becomes an issue. The reason ferrite heads are still used in hard drives is that the cost of manufacturing thin-film heads is higher.

There are two kinds of arm assemblies that hold the heads. One is a Winchester, and the other is a Whitney. Whitney is the name commonly associated with second generation Winchester technology. As can be seen in Figure 1, the Whitney arm is much more streamlined than the Winchester. The Whitney arm improves read/write signal reliability by improving flying height stability and tracking accuracy, and reducing interfering signals from adjacent tracks (thus yielding a higher signal-to-noise ratio). Ferrite heads are normally used with the Winchester arm, while thin-film heads are used with the Whitney arm.

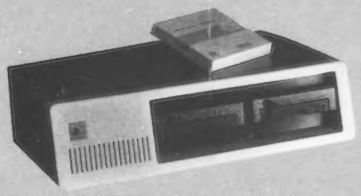
## What is Your Position(er)

One of the hard disk specs often bandied about is average access time. This is the mean time needed to reposition the read/write head from one data record to another and includes average latency, or the rotational delay of the spinning disk. One drive might have an average access time of 85 milliseconds (ms), while another has a time of 38 ms or less. Why the difference?

The difference lies in the type of positioning mechanism used in the drive. A low-cost, low-capacity drive usually uses an open-loop stepper motor to move the heads from track to track. Once a command to seek a particular track is given, the stepper motor shaft clicks off the desired number of steps. This system relies on the mechanical accuracy of the motor to bring the heads to the correct location. And since this is a purely mechanical system, parts wear out over time and cause failures and longer access times.

A more accurate (and more expensive) way to position heads is with a closed loop, rotary voice coil positioner. (You may recall that a voice coil is also used to move the cone of a speaker; it is a hollow cylinder around which coils of wire are wrapped.) A closed-loop servo

Above: Control Data's model 9415 Wren 5¼" fixed disk drive is a full-height model with oxide disks and Winchester head/arm assembly. Below: Xcomp's 10-N-10 contains two 10 Mb removable cartridge hard disk drives.



Robby, one of five robots used by the Nashua Corporation to produce more than 400,000 5.25" oxide-coated hard disks per month, is among the automated devices helping the company to achieve consistent high quality. Robby and its companion Lefty travel six miles a day upside down so as not to interfere with equipment on the floor or contaminate the clean room in which the disks are processed. Because of their placement, the robots must work together, each relying on the other for tasks it cannot do. Robby, for instance, can take an aluminum disk off a tray and place it in a coating machine, but cannot put it on the inspection rack. Lefty, on the other hand, can place a disk in the coating machine, remove it, and put it on the rack, but cannot reach the tray of aluminum disks. So, along with the disks that it has coated, Robby passes uncoated aluminum disks to Lefty. Lefty, in turn, takes its own as well as Robby's disks to the inspection table.

system employs electrical feedback to find a desired location on the disk. The information needed by the positioning mechanism to determine its distance from a specified location is contained either on a dedicated servo surface (DSS), which is one of the hard disk surfaces, or embedded in all the record gaps on every track.

Some of Tandon's new disk drives use a pseudo closed-loop head positioning system. In this method, servo positioning information is embedded in the microscopic index wedge located on each data track. The drive checks its location during each disk revolution and corrects its position if necessary. This positioner is more accurate than an open-loop system, yet less expensive than a closed-loop servo system. However, it does not produce faster access times.

## Small But Rugged

Though 5.25" hard disk drives have become a standard for microcomputer systems, 3.5" hard drives are waiting in the wings. The smaller drives are a natural for desktop computers with small footprints and for portable models. And drives not only get smaller but they get thinner, too. Half-height 5.25" drives are already available. It seems only a matter of time before one-third height 5.25" drives and half- and one-third height 3.5" drives become available.

Both 5.25" and 3.5" drives are more rugged these days, too. It used to be that hard drives were very susceptible to head crashes if the drive was moved. Now there are drives that automatically park and lock the heads in a dedicated landing zone upon power down. Other drives use a mechanism that lifts the arm up and away from the disk any time power is shut off.

## And Away We Go

One of the drawbacks of using a hard disk drive is that the disk cannot be removed and transported. In fact, Winchester technology is based on the condition that disks and heads reside in a protected, sealed environment. However, some companies have tried to circumvent this limitation by manufacturing drives with removable hard disks. The problem is that inserting or removing the cartridge exposes both the media and the drive to contamination and possible damage.

Though these companies have a good idea—removable media—reliability has been suspect. But now drive manufacturers are trying to lick the reliability problem by incorporating fully retracting heads into their drives. Like a frightened turtle, the drive pulls its head into its body (and away from the disk) whenever it senses a loss of power. The heads are re-extended only after the disk has come up to speed and the cartridge compartment has been completely filtered of contaminants.

Reliability problems will no doubt continue to plague new efforts in the removable media area. But the success of companies such as Iomega, whose Bernoulli Box disk drive looks like a floppy system but acts like a removable hard drive, indicate that interest is strong in the microcomputer community.

## Putting It All Together

If 5Mb hard disk drives are already gone, what is the future of 10Mb drives? It seems that the microcomputer world is caught up in the larger (storage capacity), faster, smaller (physical size) madness when it comes to hard disks. There are many factors that enable one hard disk to outperform another. And as performance continues to improve, it will be imperative for users to find out what is inside the drives that are so carefully protected from the outside world.■

# Installing and Using a Hard Disk

With prices dropping dramatically, more and more personal computer owners begin to consider adding hard disk drives to their systems. Is it difficult to do? Actually it is fairly simple, even though some problems may arise.

## Hard Disks and DOS

The first thing you should ask yourself before purchasing a hard disk is: "Does my disk operating system support a hard disk?" You can answer yes to this question if you are using a DOS like PC-DOS on an IBM PC or ProDOS on an Apple II series microcomputer. If, however, you are using the Macintosh Finder, you will find that it doesn't support a hard disk. But this doesn't mean that your computer can't use a hard disk. What it does mean is that you will have to depend on the disk manufacturer to supply software that modifies your DOS.

## Installing a Hard Disk

When you purchase a hard disk system, you will receive the disk drive, a controller card, and software. Outboard drives normally include their own power supplies. Drives that fit inside the computer case usually get their power from the computer. You should be aware that a drive that gets its power from the computer can easily overload your system, especially if you have already installed some add-on boards.

Installing the drive is just a matter of placing the controller card into a slot on the motherboard, attaching the card to the disk with a cable, and connecting the disk to the power supply. (Some Macintosh disks connect to the RS-232/422 port rather than to a controller card.) Once you have installed the drive, you may need to format it physically. Drive manufacturers often perform this task, but they also provide the software needed to do it, just in case the formatting has been destroyed during shipping. Physical formatting puts on the disk address and timing marks, which the disk controller needs.

Before you can begin using the hard disk you must also format it logically. This is done with the normal DOS formatting command. Before you format the disk, though, you may want to partition it. Partitioning the disk divides

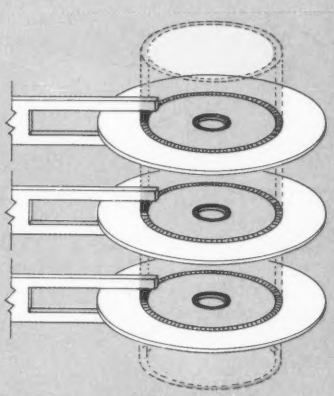


**Figure 2. A cylinder is made up of corresponding tracks on the top and bottom surface of each disk in the drive.**

# Hard Disk Drive Comparison Chart

This comparison chart should help you choose the hard disk drive that is right for you. The information was gleaned from manufacturer's press releases and specification sheets. Most are for the IBM PC and compatibles; drives designed for other computers are noted. For more information about a particular drive, address inquiries to the vice president of marketing of the appropriate company, and don't forget to mention that you read about the product in *Creative*. —*Russ Lockwood*

| Manufacturer | Model | Price | Internal or External | Storage |
|---|---|---|---|---|
| Alloy Computer Products<br>100 Pennsylvania Ave.<br>Framingham, MA 01701<br>(617) 875-6100 | PC-QuicStor | $4595 | E | 20Mb-170Mb |
| | | $11,295 | | |
| | microStor<br>(with tape backup) | $2995 | E | 20Mb |
| Ampex Computer Products<br>10435 N. Tantau Ave.<br>Cupertino, CA 95014<br>(408) 725-2019 | PCM 113 | $1595 | E | 10Mb |
| | PCM 127 | $1695 | E | 20Mb |
| | PCM 227<br>(with tape backup) | $3400 | E | 20Mb |
| Apparat<br>4401 S. Tamarac Pkwy.<br>Denver, CO 80237<br>(303) 741-1778 | External Hard Disk | $809-$1349* | I | 22Mb-33Mb |
| | External Hard Disk<br>(with tape backup) | $1449-$1989 | E | 22Mb-33Mb |
| | *$100 rebate with trade-in of working 10Mb drive | | | |
| Apple Computer<br>20525 Mariani Ave.<br>Cupertino, CA 95014<br>(408) 996-1010 | 5Mb ProFile | $1495 | E | 5Mb |
| | 10Mb ProFile | $1995 | E | 10Mb |
| AST Research<br>2121 Alton Ave.<br>Irvine, CA 92714<br>(714) 863-1333 | Colossus | $7499 | E | 67Mb |
| CMC International<br>1720-130th Ave. NE<br>Bellevue, WA 98005<br>(206) 885-1600 | 16Mb Targa + Tape | $2595 | E | 16Mb |
| | 33Mb Targa + Tape<br>(includes tape backup unit) | $3595 | E | 33Mb |
| Celerity Computing<br>9692 Via Excelencia<br>San Diego, CA 92126<br>(619) 271-9940 | 4140 | $25,000 | E | 1.6Gb |
| Chase Technologies<br>375 Sylvan Ave.<br>Englewood Cliffs, NJ<br>07632<br>(201) 894-5544 | CTI series | $7595-$23,400 | E | 100Mb-550Mb |
| | CTI series<br>(with tape backup) | $9595-$25,500 | E | 100Mb-550Mb |
| | CTI (IBM PC AT) | $6995 | I | 100Mb |
| Commodore<br>1200 Wilson Dr.<br>West Chester, PA 19380<br>(215) 431-9100 | Hard Disk<br>(C64 and C128) | $599 | E | 10Mb |
| Compaq<br>20333 FM 149<br>Houston, TX 77070<br>(713) 370-7040 | 10Mb Drive | $1695 | E | 10Mb |
| | 30Mb Drive<br>(for Compaq computers) | $2995 | I | 30Mb |

the disk into separate areas that can be used by different operating systems. For example, you may want to use PC-DOS and CP/M-86 on your IBM PC hard disk. A PC-DOS command lets you do this. The only thing you have to decide is how many cylinders to allot to each operating system. A cylinder is a set of corresponding tracks of a disk stack (see Figure 2). Once you do this, the partition acts as a separate disk drive. Each partition must be formatted independently. ProDOS doesn't provide a command for partitioning your hard disk, so you must rely on the manufacturer to provide this option in its software.

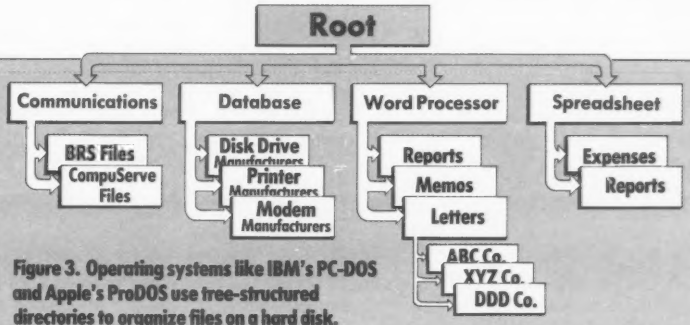



**Figure 3. Operating systems like IBM's PC-DOS and Apple's ProDOS use tree-structured directories to organize files on a hard disk.**

## Using a Hard Disk

Operating systems like PC-DOS and ProDOS provide a "tree" structured directory system that enables you to make efficient use of the hard disk. This tree is similar to a family tree. A root directory is at the top and underneath are the branches. A typical directory might look like the one in Figure 3.

If the operating system you use does not have a tree structured directory, the software that comes with the hard disk usually provides a compromise solution. For instance, if you buy a hard drive for the Macintosh, the software should allow you to construct volumes. These volumes act like virtual floppy disks with higher capacities than normal. Thus a 10Mb hard disk might be divided into ten 1Mb volumes, each of which functions essentially like a floppy disk. If the software doesn't allow you to do this, you may not be able to use all the space available on the hard disk.

## Backing Up the Hard Disk

Owning a hard disk usually requires adding an extra chore to your daily computing routine—backing up the disk. Here again, an operating system like PC-DOS can help you with this, since it includes two commands for this purpose, Backup and Restore. If you wish, you can back up your hard disk to floppies. This method, however, is tedious. It is more convenient (and more expensive) to use a tape backup system, especially when you have a disk with a capacity greater than 10Mb. If your operating system doesn't support backup procedures, make sure the software included with the hard disk does.

Owning a hard disk presents a whole new set of challenges to the serious computer user. The key to success is to evaluate your system needs carefully and choose a product that offers both hardware and software solutions to the problems that accompany the benefits of increased speed and storage capacity.—*JD*

| Manufacturer | Model | Price | Internal or External | Mounting Storage |
|---|---|---|---|---|
| Computer Memories<br>9216 Eton Ave.<br>Chatsworth, CA 91311<br>(818) 709-6445 | CM 3426<br>CM 6853<br>CM 7880 | N/A<br>N/A<br>N/A | I<br>I<br>E | 25Mb<br>40Mb<br>80Mb |
| Computer Specialties<br>P.O. Box 1718<br>Melbourne, FL 32902<br>(305) 725-6574 | CSI ST10C<br>(for Commodore computers) | $1595 | E | 10Mb |
| Control Data<br>2200 Berkshire Ln. N.<br>Plymouth, MN 55441<br>(800) 328-3390 | StorageMaster 630<br>(IBM PC AT)<br>StorageMaster 530<br>Storage Master 518 | $2145<br><br>$3390<br>$2595 | I<br><br>E<br>E | 30Mb<br><br>30Mb<br>18Mb |
| Core International<br>542 SE 5th Ave.<br>Delray Beach, FL 33444<br>(305) 276-3929 | ATPlus<br>(IBM PC AT) | $1595-<br>$5495 | I | 20Mb-<br>72Mb |
| Corvus<br>2100 Corvus Dr.<br>San Jose, CA 95124<br>(408) 559-7000 | Omnidrive<br><br>Trimline<br>(with tape backup) | $1995-<br>$4995<br>$3295 | E<br><br>E | 5Mb-<br>45Mb<br>20Mb |
| Datatron<br>2942 Dow Ave.<br>Tustin, CA 92680<br>(714) 544-9970 | Slim 2000<br>(includes 10Mb tape backup) | $2995 | E | 10Mb |
| Davong Systems<br>217 Humbolt Ct.<br>Sunnyvale, CA 94089<br>(408) 734-4900 | Mac Disk<br>(Macintosh)<br>Fixed Disk<br>(IBM) | $1950-<br>$3995<br>$1950-<br>$6995 | E<br><br>E | 10Mb-<br>43Mb<br>10Mb-<br>86Mb |
| Eicon Research<br>520 5th Ave. 6th Fl.<br>New York, NY 10036<br>(212) 719-5353 | DisCache DCH10<br>DisCache DCH20<br>DisCache DCH40 | $3350<br>$4250<br>$5650 | E<br>E<br>E | 10Mb<br>20Mb<br>40Mb |
| Emerald Systems<br>4901 Morena Blvd.<br>San Diego, CA 92117<br>(619) 270-1994 | Hard Disk 40<br>Hard Disk 65<br>Hard Disk 140<br>Hard Disk 280 | $4350<br>$5850<br>$8850<br>$15,850 | I<br>I<br>I<br>I | 35Mb<br>56Mb<br>119Mb<br>238Mb |
| Falcon Technology<br>6644 S. 196th St.<br>Kent, WA 98032<br>(206) 251-8282<br>(800) 722-2510 | PC eXTender<br><br>PC eXTender | $1495-<br>$2595<br>$1695-<br>$2795 | I<br><br>E | 10Mb-<br>30Mb<br>10Mb-<br>30Mb |
| First Class Peripherals<br>2158 Avenue C<br>Bethlehem, PA 18001<br>(800) 538-1307 | Sider<br>(Apple II) | $695 | E | 10Mb |
| GA Trade<br>1045 S. East St.<br>Anaheim, CA 92803<br>(714) 778-4800 | X-Plus 1010DS<br><br>X-Plus 1010D | $2995<br><br>$1595 | E<br><br>E | two<br>10Mb<br>10Mb |
| General Computer<br>215 First St.<br>Cambridge, MA 02142<br>(617) 492-5500 | Hyperdrive<br>(Macintosh) | $2200<br>(installed) | I | 10Mb |
| Great Lakes Computer<br>2200 W. Higgins Rd.<br>Hoffman Estates, IL 60195<br>(312) 884-7272 | Superior<br>Stowaway 10 | $1350 *<br>$1115 | E<br>I | 10Mb<br>10Mb |

| Manufacturer | Model | Price | Internal or External Mounting | Storage |
|---|---|---|---|---|
| Hewlett-Packard<br>1820 Embarcadero Rd.<br>Palo Alto, CA 94303<br>(408) 257-7000 | HP 9133D<br>HP 9134D | $3345<br>$3040 | E<br>E | 15Mb<br>15Mb |
| I-2 Interface<br>21101 Osborne St.<br>Canoga Park, CA 91304<br>(818) 341-7914 | DiskSystem<br><br>Double Barrel<br>(with tape backup) | $1295<br>$7900<br>$1595-<br>$2595 | E<br><br>I | 10Mb-<br>120Mb<br>10Mb-<br>30Mb |
| Ideassociates<br>35 Dunham Rd.<br>Billerica, MA 01821<br>(617) 275-4430 | Ideadisk<br>series | $1595-<br>$9995 | E | 5Mb-<br>130Mb |
| Innovative Data<br>5340 Eastgate Mall<br>San Diego, CA 92121<br>(619) 587-0555 | Hard Disk (PC)<br><br>Hard Disk (PC AT)<br>(with tape backup) | $5600-<br>$8300<br>$6895-<br>$10,395 | E<br><br>E | 59Mb-<br>126Mb<br>59Mb-<br>126Mb |
| Interphase<br>2925 Merrell Rd.<br>Dallas, TX 75220<br>(214) 350-9000 | FDS-590<br>RDS-350<br>RDS-375 | $21,500<br>$7995<br>$9495 | E<br>E<br>E | 590Mb<br>50Mb<br>75Mb |
| Kamerman Labs<br>7787 SW Cirrus Dr.<br>Beaverton, OR 97005<br>(503) 626-6877 | MegaFlight series<br><br>Masterflight<br>(with tape backup) | $895-<br>$1795<br>$2295-<br>$5795 | I<br><br>E | 10Mb-<br>30Mb<br>10Mb-<br>60Mb |
| Kustom Electronics<br>8320 Nieman Rd.<br>Lenexa, KS 66214<br>(800) 255-6311 | Sunflower<br>(4 models with<br>removable<br>cartridges) | $1855-<br>$2995 | E | 10Mb-<br>30Mb |
| Maynard Electronics<br>430 E. Semoran Blvd.<br>Casselberry, FL 32707<br>(305) 331-6402 | Apollo<br>(with power supply)<br>Apollo<br>(IBM PC AT) | $2595<br><br>$1995 | I<br><br>I | 30Mb<br><br>30Mb |
| Micro Design<br>6586 University Blvd.<br>Winter Park, FL 32792<br>(305) 677-8333 | IS00 (IBM PC) | $715 | I | 10Mb |
| Mountain Computer<br>300 El Pueblo Rd.<br>Scotts Valley, CA 95066<br>(408) 438-6650 | 6300 Combo (AT&T)<br>(with tape backup)<br>Filesafe<br>Dynamic series | $5595<br><br>$9990<br>$2395-<br>$4495 | E<br><br>E<br>E | 30Mb<br><br>120Mb<br>10Mb-<br>35Mb |
| NCR<br>3718 N. Rock Rd.<br>Wichita, KS 67226<br>(316) 688-8510 | 6097 Disk File<br>6097 Disk/Tape<br>(with tape backup) | $3495<br>$4995-<br>$5495 | E<br>E | 30Mb<br>30Mb-<br>60Mb |
| Osicom<br>18 Bank St.<br>Morristown, NJ 07960<br>(201) 540-0144 | Rose 10I<br>(IBM PC, Tandy)<br>Rose series | $699*<br><br>$899-<br>$5299*<br>*$40 extra for Tandy 1000 | I<br><br>E | 10Mb<br><br>10Mb-<br>140Mb |
| Paradise Systems<br>150 N. Hill Dr.<br>Brisbane, CA 94005<br>(415) 391-2694 | Mac-10<br>(Macintosh) | $1495 | E | 10Mb |
| PC's Limited<br>7801 N. Lamar<br>Austin, TX 78752<br>(512) 452-0323 | PC AT Hard Disk<br>PC AT Hard Disk<br>PC AT Hard Disk<br>PC Hard Disk | $795<br>$1195<br>$3995<br>$645<br>$1695 | I<br>I<br>E<br>E | 20Mb<br>33Mb<br>117Mb<br>10Mb-<br>42Mb |

| Manufacturer | Model | Price | Internal or External Mounting | Storage |
|---|---|---|---|---|
| Peachtree Technology Inc.<br>3020 Business Park Dr.<br>Norcross, GA 30071<br>(404) 662-5158 | P10-XT<br>(IBM PC XT) | $995 | I | 10Mb |
| Percom Data<br>11220 Pagemill Rd.<br>Dallas, TX 75243<br>(214) 840-3032 | Superior Interior<br><br>PHD line | $1198-<br>$2398<br>$1790-<br>$2950 | I<br><br>E | 10Mb-<br>30Mb<br>10Mb-<br>30Mb |
| Priam<br>20 W. Montague Expy.<br>San Jose, CA 95134<br>(408) 946-4600 | Cluster Tower<br>Cluster Tower<br>Innerspace ID40XT<br>Innerspace ID60XT | $10,995<br>$13,995<br>$2195<br>$2595 | E<br>E<br>I<br>I | 160Mb<br>292Mb<br>43Mb<br>60Mb |
| Quadram<br>4355 International Blvd.<br>Norcross, GA 30093<br>(404) 923-6666 | Quaddisk Line | $1995-<br>$6500 | I | 6Mb-<br>72Mb |
| Quark<br>2525 W. Evans<br>Denver, CO 80219<br>(303) 934-2211 | QC-10<br>QC-20 | $1995<br>$2595 | E<br>E | 10Mb<br>20Mb |
| Qubie<br>4809 Calle Alto<br>Camarillo, CA 93010<br>(800) 821-4479 | PC10 | $794 | I | 10Mb |
| Racet<br>1855 W. Katella<br>Orange, CA 92667<br>(714) 997-4950 | PCMS-150<br>PCMS-411 | $15,900<br>$24,400 | E<br>E | 150Mb<br>411Mb |
| Standard Data<br>3040 SW 10th St.<br>Pompano Beach, FL 33069<br>(305) 971-2800 | First Mate<br>(with tape backup) | $2795-<br>$6995 | E | 12Mb-<br>85Mb |
| Sunol Systems<br>1187 Quarry Ln.<br>Pleasanton, CA 94556<br>(415) 484-3322 | Sun*Disk<br><br>Sun*Mac<br>(Macintosh) | $1995-<br>$6695<br>$2195-<br>$8245 | E<br><br>E | 10Mb-<br>92Mb<br>10Mb-<br>92Mb |
| SyQuest<br>47923 Warm Springs Rd.<br>Fremont, CA 94539<br>(415) 490-7511 | SQ312RD<br>SQ306RD | $1095<br>$995 | I<br>I | 10Mb<br>5Mb |
| Sysgen<br>47853 Warm Springs Blvd.<br>Fremont, CA 94539<br>(415) 490-6770 | II-G-10<br>II-G-20<br>XT-Extra<br>Sysgen XL<br>Disc-File | all include tape backup | $3295<br>$3995<br>$1395<br>$3295<br>$2995 | E<br>E<br>E<br>E<br>E | 10Mb<br>20Mb<br>10Mb<br>20Mb<br>18Mb |
| Systems Peripherals<br>9747 Business Park Ave.<br>San Diego, CA 92131<br>(619) 693-8611 | Ultrastore 70<br>Ultrastore 140<br>Diskitjr<br>I series | | $3995<br>$4995<br>$1295<br>$1295-<br>$2695 | E<br>E<br>E<br>E | 70Mb<br>140Mb<br>10Mb<br>10Mb-<br>40Mb |
| Tallgrass Technologies<br>11100 W. 82nd St.<br>Overland Park, KS 66214<br>(913) 492-6002 | 5000/6000 series<br>(4 models include<br>tape backup) | | $2995-<br>$7495 | E | 25Mb-<br>80Mb |
| TeamMate<br>2775 Northwestern Pkwy.<br>Santa Clara, CA 95051<br>(408) 496-0434 | 1120<br>1120AT<br>1220<br>1132 | | $1795<br>$1295<br>$2295<br>$2795 | I<br>I<br>E<br>I | 20Mb<br>20Mb<br>20Mb<br>32Mb |

| Manufacturer | Model | Price | Internal or External | Mounting Storage |
|---|---|---|---|---|
| Tecmar<br>6225 Cochran Rd.<br>Solon, OH 44139<br>(216) 349-1009 | PC-Mate | $2495-<br>$3995 | E | 10Mb-<br>33Mb |
| | QIC-60<br>(with tape backup) | $3495 | E | 20Mb |
| | AT HD | $1995 | I | 20Mb |
| | MacDrive | $1995 | E | 10Mb |
| | MassFile<br>(with tape backup) | $8995 | E | 86Mb |
| Texas Instruments<br>P.O. Box 402430<br>Dallas, TX 95240<br>(800) 527-3500 | Winchester<br>(for TI Pro) | $2295 | I | 10Mb |
| Xcomp<br>3554 Ruffin Rd. S.<br>San Diego, CA 92123<br>(619) 573-0077 | X-Combo series | $3495-<br>$3995 | E | 20Mb-<br>43Mb |
| | 10-N-10 | $3595 | I | two<br>10Mb |
| Viasyn<br>3506 Breakwater Ct.<br>Hayward, CA 94545<br>(415) 786-0909 | HD-40<br>HD-80<br>(with 5.25"<br>floppy drives) | $2995<br>$5995 | E<br>E | 40Mb<br>80Mb |
| Vufax<br>5301 Covington Hwy.<br>Decatur, GA 30035<br>(404) 981-6778 | Infax | $2595 | E | 10Mb |

# Tape Backup Comparison Chart

| Manufacturer | Model | Price | Internal or External | Mounting Storage |
|---|---|---|---|---|
| Ampex Computer Products<br>10435 N. Tantau Ave.<br>Cupertino, CA 95014<br>(408) 725-2017 | PCM 325 | $1820 | E | 25Mb |
| California Computer<br>3303 Harbor Blvd.<br>Costa Mesa, CA 92626<br>(714) 966-1661 | Filestar | $1395 | I | 60Mb |
| Cipher Data Products<br>P.O. Box 85170<br>San Diego, CA 92138<br>(619) 578-9100 | 5210 Floppytape | $1095 | E | 25Mb |
| Control Data<br>2200 Berkshire Ln. N.<br>Plymouth, MN 55441<br>(612) 853-3276<br>(800) 232-6789 | 745 StorageMaster | $2495 | E | 45Mb |
| Davong<br>217 Humboldt Ct.<br>Sunnyvale, CA 94089<br>(408) 734-4900 | System Tape | $1895 | E | 24Mb |
| Great Lakes Computer<br>2200 W. Higgins Rd.<br>Hoffman Estates, IL 60195<br>(312) 884-7272 | Quartermaster<br>Quartermaster | $995<br>$1295 | I<br>E | 60Mb<br>60Mb |
| Hewlett-Packard<br>1820 Embarcadero Rd.<br>Palo Alto, CA 94303<br>(408) 257-7000 | HP 9144A | $3500 | E | 67Mb |
| I-2 Interface<br>21101 Osborne St.<br>Canoga Park, CA 91304<br>(818) 341-7914 | TapeSystem 10<br>TapeSystem 45<br>TapeSystem 60 | $995<br>N/A<br>N/A | E | 10Mb<br>45Mb<br>60Mb |
| Maynard Electronics<br>430 E. Semoran Blvd.<br>Casselberry, FL 32707<br>(305) 331-6402 | MaynStream | $1595-<br>$2095 | E | 20Mb-<br>60Mb |
| Memodyne<br>220 Reservoir St.<br>Needham Heights,<br>MA 02194<br>(617) 444-7000 | MS-1000 | $1395 | E | 10Mb |
| Memtec<br>Keewaydin Dr.<br>Salem, NH 03079<br>(603) 893-8080 | Companion 400<br>series<br>(2 models) | $450 | I | 20Mb-<br>40Mb |
| Mountain Computer<br>300 El Pueblo Rd.<br>Scotts Valley, CA 95066<br>(408) 438-6650 | FSTI27-AT<br>FSTI60-AT<br>(for IBM PC AT)<br>Mini-Mtn MMT<br>Mini-Mtn MMT | $1595<br>$1695<br><br>$1795<br>$1895 | I<br>I<br><br>E<br>E | 27Mb<br>60Mb<br><br>27Mb<br>60Mb |
| Quadram<br>4355 International Blvd.<br>Norcross, GA 30093<br>(404) 923-6666 | Quadtape series<br>(2 models)<br>Quadtape series<br>(2 models) | $1395-<br>$1695<br>$1595-<br>$1895 | I<br><br>E | 20Mb-<br>60Mb<br>20Mb<br>60Mb |
| Standard Data<br>3040 SW 10th St.<br>Pompano Beach, FL 33069<br>(305) 971-2800 | Second Mate | $1895 | E | 25Mb |
| Sysgen<br>47853 Warm Springs Blvd.<br>Fremont, CA 94539<br>(415) 490-6770 | Smart Image<br>Qic-File | $995<br>$1395-<br>$1495 | E<br>I/E | 10Mb<br>20Mb-<br>45Mb |
| Tallgrass Technologies<br>11100 W. 82nd St.<br>Overland Park, KS 66214<br>(913) 492-6002 | 4060 | $1995 | E | 60Mb |
| Tandberg Data<br>571 N. Poplar<br>Orange, CA 92668<br>(714) 978-6771 | Deputy<br>Deputy<br>Qic-Stor | $995<br>$1295<br>$1575 | I<br>E<br>E | 60Mb<br>60Mb<br>60Mb |
| Telebyte Technologies<br>270 E. Pulaski Rd.<br>Greenlawn, NY 11740<br>(516) 423-3232 | Packetape | $2990 | E | 67Mb |
| Variant Technologies<br>16129 Wyandotte St.<br>Van Nuys, CA 91406<br>(818) 904-9780 | BakPak<br>(for IBM PC/XT)<br>BakPak II<br>(for IBM PC AT) | $995<br><br>$1095 | E<br><br>E | 26Mb<br><br>26Mb |
| Viasyn<br>3506 Breakwater Ct.<br>Hayward, CA 94545<br>(415) 786-0909 | Tape drive<br>(for CompuPro<br>10 Plus) | $1095 | I | 10Mb |

# The Sider

10Mb of mass storage for Apple II computers at a bargain price/**Barry Bayer**

Five years ago I drooled over the new 5Mb Winchester hard disk drives being introduced to the Apple II market. Although I knew how useful a hard disk could be, I also knew that I would never be able to justify the purchase of a $3000 mass storage device for a $2000 computer. I also knew that I would never be able to fill 5Mb of disk space.

How times have changed. Today, a full fledged Apple IIc or IIe costs a little over $1000. And a 10Mb hard disk drive costs only $695. That's right. First Class Peripherals offers the Sider, a hard disk drive with 10Mb partitionable among four operating systems for $695.

Installation of the Sider alongside my IIe was uneventful, and I soon found myself faced with the challenge of allocating the 10Mb to the four operating systems currently in use by Apple and supported by the Sider—DOS 3.3, ProDOS, Pascal (1.1 and 1.2), and CP/M. The decision requires some thought, because once partitioned, the entire disk must be reformatted (and all existing files destroyed) if the allocation is changed. Once you have decided on the allocation, the formatting process takes 17 minutes—a long time by IBM PC standards—but remember that you shouldn't have to do it very often.

DOS 3.3 is operational right away, but you must supply and install the appropriate software (and in the case of CP/M, hardware) for the other operating systems. The DOS 3.3 utilities include a revised FID program to aid in hard disk file transfer and a facility that allows you to place altered versions of DOS 3.3, such as DavidDOS and DiversiDOS, on the boot track of the DOS 3.3 partition, so you can boot your favorite flavor of 3.3.

As part of the partitioning process, you decide how much space to allocate to standard 140K DOS volumes and how much to devote to 400K volumes. Your 3.3 space is then divided into as many volumes of the requested types as possible.

Installation of UCSD Apple Pascal, CP/M, and ProDOS is straightforward, although the instructions in the manual, which must be followed exactly, are not as clear and complete as they could be.

## Hardware Profile

**Name:** The Sider
**Type:** 10Mb hard disk drive
**System:** Apple II+, IIe
**Dimensions:** 7.5" x 16" x 3.5"
**Software:** Installation disk and utilities
**Documentation:** 54-page user's guide
**Summary:** Effective mass storage at a bargain price
**Price:** $695
**Manufacturer:** First Class Peripherals
2158 Avenue C
P.O. Box 6187
Bethlehem, PA 18001
(800) 538-1307

### Copy Protection Problems

A factor that may detract significantly from the usefulness of the Sider to some users is the inability to boot from a copy protected disk. If you have managed to convert your *VisiCalc* to a binary file, for example, you will be able to upload to the Sider. You will not be able, however, to transfer the program to the Sider from either the original disk or a backup copy made with a copy program. Nor will you be able to store data created with such disks on the Sider.

This same problem, of course, exists with all hard disk drives available for the Apple II family and is not peculiar to the Sider. The solution will come, I think, if First Class Peripherals sells as many Siders as I think they will. I am sure that it will not be long before someone develops a pre-boot for the more popular protected programs—just as happened with many 80-column and memory expansion cards.

Programs written under Pascal, ProDOS, and CP/M tend not to be copy protected, and I had no trouble transferring Apple1, Apple2, and Apple3 to my Pascal partition; *SuperCalc2*, STAT.COM, and PIP.COM to the CP/M file, and *Appleworks* to the ProDOS section.

### Pros and Cons

The only complaint I have about the Sider in operation is the very slow (15 to 20 seconds) response it offers to the VOLUME command from the Pascal system Filer; loading, compiling, copying, saving, and just about everything else you might want to do with a hard disk are pleasant and quick.

What may be less pleasant and quick for less experienced users is dealing with a company that sells only by mail order. My dealings with First Class Peripherals were all positive, but I know that business users in particular often expect turnkey operation and feel more comfortable when there is a dealer nearby to provide backup assistance.

And speaking of backup, backup of the Sider is presumably to floppy disks—not a particularly appealing prospect as a regular routine. Although almost everyone, including IBM, seems to have accepted the backup to floppy procedure, I suggest that the cheapest reasonable form of backup for serious users is a second Sider daisychained to the first.

Probably the biggest caveat I would offer to prospective buyers of the Sider is to consider carefully what software you want to run and be aware of the aforementioned problem with copy protection. If you do plan to rely on copy protected software, perhaps it would be best to wait until someone develops a scheme to solve the problem.

Those minor reservations aside, I applaud the low price and great utility of the Sider and look forward to filling my 10Mb in the not-too-near future. ■

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# Commodore PC

Another unimaginative clone in an overcrowded market

**David H. Ahl**

At the spring SICOB show in Paris, I had the opportunity to use the new Commodore PC which is now being sold in the U.K., France, Germany, and Canada. Commodore has no current plans to market the PC in the U.S. because their current channels of distribution are not appropriate for a business machine of this type.

Fundamentally, the Commodore PC is an IBM PC compatible with a garden variety 8088 mpu running at a sedate 4.7MHz, the same as the IBM PC. It ran our benchmark about 15% faster than the IBM PC, probably because GW Basic (on the Commodore) is slightly faster than BasicA on the PC. For most applications, however, the speed of the two machines will be identical.

Physically, the machine resides in the usual three units: system unit, keyboard, and monitor. The system unit is a shade larger than the PC; it sports two half-height 360K floppy disk drives on the right. It has a serial and a parallel port (with the IBM style 25-connector D plug). Inside are five expansion slots that you won't want to access too often if your machine is like the one at the show whose cover slid open with a grating sound like a snowplow on a bare road.

A basic machine is equipped with 256K of RAM. Additional memory, up to 640K, can reside on the main motherboard, which also contains the serial and parallel ports (no extra card needed).

The keyboard has a few minor changes compared to the IBM unit—specifically a larger RETURN key, CAPS LOCK and ALT keys away from the spacebar, and LEDs on the CAPS LOCK and NUM LOCK keys. These changes are nice, but on the con side, the keyboard is much lighter than the IBM unit giving it an insubstantial, plastic feel.

Naturally, the Commodore people told me that their PC was fully compatible with the IBM PC and, indeed, all the software packages at the show ran flawlessly (including *Lotus 1-2-3* and *Flight Simulator*). However, I note from Peter Bright's review in *Personal Computer World* that he found at least one piece of software that would not run.

Is there a market for yet another PC compatible? The Commodore PC is not faster than the PC and has no advanced features. A built-in parallel port and memory on the motherboard are nice, but nice doesn't sell machines. Thus, the only real selling premise is price, announced as $2000, about the same as many other compatibles. Thus, I have to agree with the conclusion of *PCW*, "too little and too late." ■

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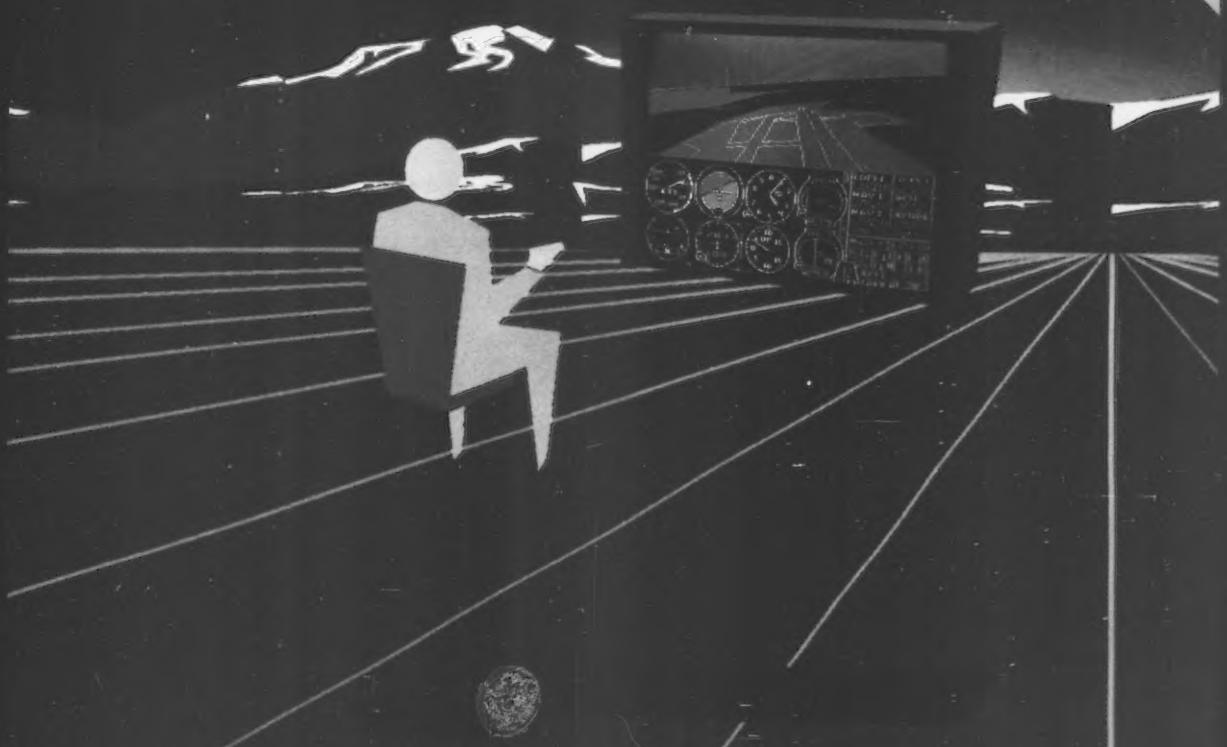

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# Sanyo MBC-775

Transportable RGB color/**Russ Lockwood**

**Ahl's Simple Benchmark Test**

| | Time | Accuracy | Random |
|---|---|---|---|
| IBM PC | 24 seconds | 0.01159668 | 6.3 |
| MBC-775 | 10 seconds | 0.05859375 | 7.2 |

## Hardware Profile

**Name:** Sanyo MBC-775
**Type:** Transportable business computer
**CPU:** 16-bit 8088-2; 8 MHz
**RAM:** 256K (expandable to 640K)
**ROM:** 16K
**Keyboard:** Detachable, 84 keys, slant adjustable
**Display:** 80 x 25 characters; 320 x 200 pixels (four colors)
**Disk Drives:** Two 360K 5.25" floppy drives
**Ports:** One parallel
**Dimensions:** Main unit 20.8" x 16.5" x 8.8"; keyboard 19.8" x 7.5" x 1.2"
**Weight:** 43.1 lbs.
**Operating System:** MS-DOS
**Documentation:** Three-ring looseleaf manuals
**Summary:** This high-speed, price-conscious transportable offers RGB color to go. Weight and so-so IBM PC compatibility will be deciding factors in a sale
**Price:** 256K, graphics board, two floppy drives, and 9" RGB monitor $2599
**Manufacturer:** Sanyo Business Systems
51 Joseph St.
P.O. Box 387
Moonachie, NJ 07074
(201) 440-9300

Given the choice, most people select color graphics over monochrome graphics. Color certainly enhances bar graphs and pie charts and brightens up educational and entertainment software. Until recently, however, those for whom transportability was an important factor in their choice of a computer were limited to monochrome displays. The trade-off was clear: pulchritude or portability.

But color lovers need trade no longer. Last month we told you about the ISM Express; here we take a close look at the Sanyo MBC-775, a transportable that packs a 9" RGB monitor.

Instead of the standard 4.77 MHz 8088 microprocessor found in most IBM PC compatibles, Sanyo uses the 8088-2, a turbocharged version operating at a fast 8 MHz. What is the difference in speed? Take a look at the results of Ahl's Simple Benchmark Test. (For a complete description of the test, see the July 1984 issue of *Creative Computing*.)

The MBC-775 comes with 256K RAM expandable to 640K, 16K ROM, and 16K of video RAM. It includes two 360K 5.25" floppy drives, a built-in Centronics parallel port, and two expansion slots. These slots accept third-party expansion boards, but you must use the faster 120 nanosecond (ns) memory chips rather than the standard 200 ns chips.

The MBC-775 supports a numeric co-processor. However, just as you need faster memory chips to work with the faster clock speed of the 8088-2 microprocessor, you must also use the faster 8087-2 numeric co-processor rather than the standard 8087 chip.

The built-in 9" RGB color monitor shows up to 16 colors and provides a fine display. Text resolution is 25 lines of 80 characters, and graphics resolution is 320 x 200 pixels in four colors and 640 x 200 pixels in two colors (black and white). Sanyo uses the standard 256-character IBM character set.

Sanyo thoughtfully places the on/off switch and the sliding monitor brightness switch on the front of the machine. The keyboard plugs into the front

of the unit, providing excellent keyboard mobility and user comfort.

The keyboard has excellent tactile and aural feedback. It mimics the IBM PC keyboard with two pleasant exceptions. It places LEDs on the Num Lock and Caps Lock keys and includes an Enter key on the numeric keypad.

## Software

Sanyo bundles MS-DOS 2.11, GW Basic, and three software packages—*EasyWriter II* word processor system with *EasyMailer II* mail merge, *EasyPlanner* spreadsheet, and *EasyFiler* file management system—with the MBC-775. Thus, the MBC-775 is a functioning system right out of the box. Note that these programs were ported from the Sanyo MBC-550/555 computer. In fact, the "Read This First" section of the User's Guide notes "disk labeled MBC-550 series software can be used on the MBC-775."

Thus, when you talk about software compatibility, you are not really talking about IBM PC compatibility. The Sanyo MBC-775 should run just about everything that runs on the MBC-550 series. But when it comes to IBM PC software, you had best remember our repetitious, but important, line: try out the software you intend to use before you buy the hardware.

The de facto tests of IBM PC compatibility are *Lotus 1-2-3* and Microsoft *Flight Simulator*. The result of our tests was a 50-50 split. *Lotus 1-2-3* version 1A ran, but *Flight Simulator* did not. We then tried a variety of business, education, entertainment, and utility programs, and about half worked and half did not. In some cases, you can hear the programs running, but without video. Save yourself some frustration: try before you buy.

The MBC-775 retails for an attractive $2599 and includes the following: software, 256K RAM, 9" built-in RGB color monitor, graphics board, one parallel port, and two floppy drives.

## Color To Go Or Stay?

The Sanyo MBC-775 is a fine computer. It offers a fast microprocessor, features a built-in RGB color monitor, bundles the three major types of software, provides the transportability that many professionals need, and does it all for a very nice price. In short, it is a complete, competitively-priced system.

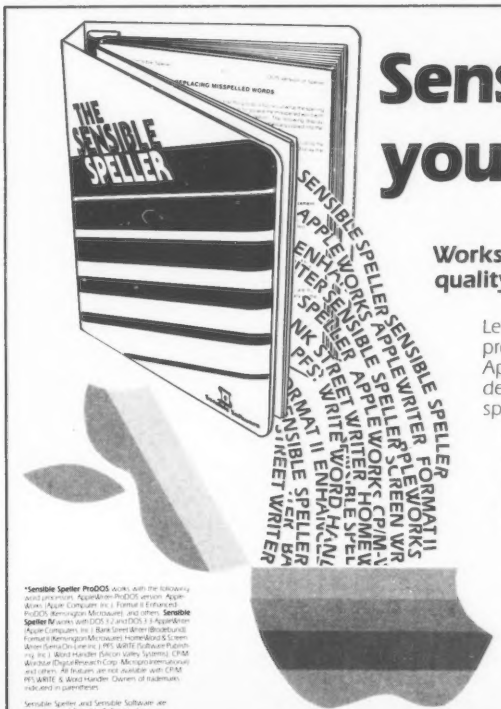
With all these good points, is there anything bad about the machine? Not really, but you should consider two points before you rush out to buy it.

The first is weight. At 43.1 pounds, carrying the MBC-775 will get you in shape for the world arm wrestling championships, ambidextrous division. We predict that you will be switching carrying arms every 25 yards.

The second is IBM PC compatibility. Our tests indicate that the MBC-775 runs roughly 50% of the off-the-shelf PC software. If you intend the computer as a stand-alone unit with the supplied software, this should not bother you. However, if you intend to exchange data and programs with IBM PC and compatible computers, you should definitely try your software on the MBC-775 before you buy.

If transportable RGB color appeals to you, then by all means take a good look at the MBC-775. It is solidly constructed, backed by a major manufacturer, and comes with everything you need to get up and running right out of the box. ■

CIRCLE **402** ON READER SERVICE CARD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CIRCLE 123 ON READER SERVICE CARD

# HP Portable Plus

## Improved portable proves that somebody out there is listening/**John J. Anderson**

My review of the machine Hewlett Packard first called the Model 110, then simply "the Portable," appeared in the July 1984 issue of *Creative Computing*. In that review, I called the machine the "almost perfect portable," and "the finest notebook computer available on the market today." Boy, did that comment annoy Grid Compass owners. But the fact was that for $3000, you got a truly portable computer with an 80 column x 16 line LCD display (largest available at the time), 384K of ROM, including *Lotus 1-2-3*, and 272K of RAM. Bundled with the ThinkJet printer, which remains among the very best portable printers available today, the Portable announced that HP had planted its feet firmly in the portable fray.

But my review was not without its criticisms, some of which were more pointed than others. Among other things. I was disappointed that there was no RAM or ROM cartridge capability. I was disappointed at the lack of a video bus. I was disappointed in *MemoMaker*, the built-in word processor.

One year later: enter the HP Portable Plus. Along with its full-screen display (80 columns x 25 lines), it sports a number of new features, while holding the price line in the range of $2295—$705 less than the original list price.

The screen display is about as legible as its 16-line ancestor, which is to say quite legible, if the room lighting is right. Fortunately the new display is somewhat more forgiving in viewing angle, and more than one person can now see the screen at one time.

The keyboard remains what I initially described as "half-stroke." While it definitely does not feel the way a keyboard really should, it is easy to get used to, and it is fast. The Portable Plus now features an "embedded" numeric keypad for serious number crunchers on the go.

*Lotus 1-2-3* and *MemoMaker* are no longer to be found as standard equipment, and only the MS-DOS 2.11 operating system, diagnostics, and *PAM*, the Personal Applications Manager, remain. All else is now optional.

The idea is that you can still upload programs serially, but the advent of "Memory Drawers" and "Software Drawers" now bring the convenience of true modularity to the HP Portable Plus. You can plug in up to 128K of ROM or RAM inboard, and increase RAM to 896K externally. The architecture of the drawer modules is open, so third party companies can contemplate custom hardware modules. We received a unit with 128K RAM drawer, *Microsoft Word* drawer, and terminal package drawer. Unfortunately the RAM drawer is not battery backed, and the contents of RAM are lost when the drawer is removed.

Photography by Jeff MacWright.

Also present in our evaluation unit was a built-in, 1200 baud modem. This is available as an option, and was unpriced at press time. Announced is a video output pack, which provides 80-column monochrome NTSC.

So . . . is the HP Portable Plus now the perfect portable? Well, nearly. The fact is there were still a few glitches that made the machine somewhat difficult to use. Most serious was the fact that *Word* and the terminal program took up twelve L-ROM slots, meaning that they could not fit into a single drawer. During our evaluation, this meant switching drawers between the composition and uploading of text, which was very annoying. The ROM versions of the software with which I was supplied are preliminary; release versions of these programs will take up three or four slots in total, enabling their cohabitation.

Further, although *Word* is a massive improvement over *MemoMaker*, which was originally supplied with the 110, the terminal package supplied is needlessly complex and yet underpowered. Merely toggling between originate and answer is an adventure in user-hostility. At the same time, endless menus offer arcane options you could more reasonably set once from a subprogram and not have to deal with again. Here too, I was supplied with preliminary software, and that HP promises true release versions will be cleaned up. As it stands, the terminal package in the original Portable is much superior to that in my Portable Plus.

The Portable Plus remains an excellent machine and probably is just about as close as we have yet come to the perfect portable. As I stated the first time around, in terms of durability, it is without parallel. Hewlett Packard, 19420 Homestead Rd., Cupertino, CA 95014. (408) 725-8111. ■

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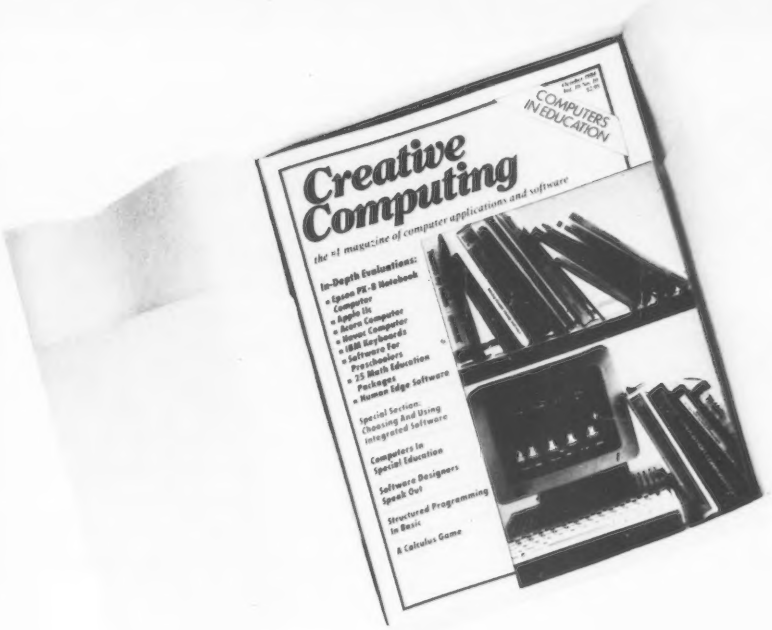
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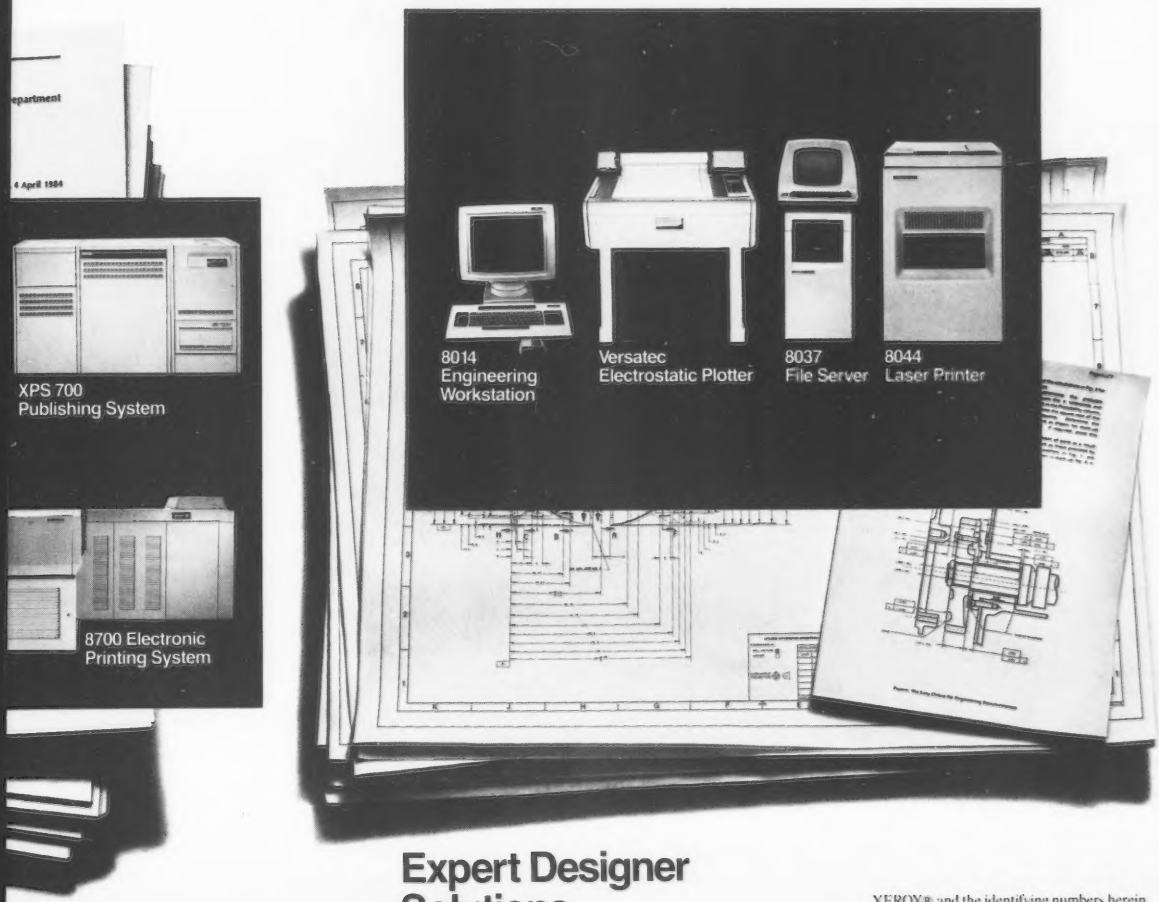


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# Citizen MSP-20

Durable, accurate, good-looking—like a fine watch/**Owen Linzmayer**

Well respected in the wristwatch industry as a maker of fine, precision timepieces, Citizen has entered the computer printer field hoping to wrest a share of the market from the Big Three: Epson, Okidata and Star Micronics. Citizen's initial entries into the market include the 200 cps MSP-20 dot matrix printer which is as attractive as it is fast.

You may be asking yourself, as I did, "How is manufacturing watches similar to making computer printers?" The answer lies in the fact that both products should be durable, accurate, and good-looking. The Citizen line of printers (MSP-10, -15, -20, and -25) certainly satisfies the last requirement. Measuring 3.1" x 15.2" x 13.5", the sleek, angular, low-profile MSP-20 is a fashionable printer with enough features to insure that it won't quickly go out of style.

The Citizen MSP-20 accepts fanfold, roll, and sheets of paper up to three parts thick. Paper can range in width from 3" to 10" (the wide-carriage MSP-25 handles 15" paper). Although the paper-handling features of the MSP-20 are comparable to those of the most popular printers on the market, I dislike the fact that neither the paper-separator nor the top cover of the MSP-20 snaps into place. What's more, when installed, the smoked-plastic top cover prevents you from using the paper cutter.

Just as many industry pundits will argue that all new computers must be IBM-compatible to succeed, it seems an unwritten rule that all new dot matrix printers must be Epson-compatible—as is the MSP-20. If that's not enough to satisfy you, the MSP-20 can also emulate two IBM-specification character sets. The character set, as well as many other features, can be invoked either by control codes from software or by the setting of DIP switches inside the printer case. Although I am a proponent of having DIP switches easily accessible, the folks at Citizen alleviate the problem somewhat by allowing you to enter a maintenance mode (power up while holding down the linefeed and on-line buttons), which prints out the current switch settings and EPROM version.

## Hardware Profile

**Name:** MSP-20 **Type:** Dot matrix
**Feed:** Friction, tractor, roll
**Speed:** 200 cps standard
**Interface:** Parallel (serial optional)
**Graphics:** 60-240 dots per inch
**Character Sets:** 8
**Logic Seek:** Yes, bidirectional
**Summary:** Full-featured with timeless beauty **Price:** $649
**Manufacturer:** Citizen America Corp.
2425 Colorado Ave.
Suite 300
Santa Monica, CA 90404
(213) 453-0614
(800) 556-1234

The linefeed and on-line buttons on the front control panel also serve to set the print quality, allowing you to switch between standard and correspondence-quality print with ease. Standard characters are composed on a 9 x 9 matrix and can be printed out at a blazing 200 characters per second. Since correspondence-quality characters are formed by making two passes of the printhead, maximum output rate in this mode is an understandably slower 50 cps. In addition to these two print modes, the MSP-20 sports emphasized, condensed, italics, proportional, expanded, double-strike, underline, elite, and sub/super-script modes (see sample printout).

Of course, no dot matrix printer is complete unless it can print in a variety of graphics modes. The Citizen MSP-20 is no exception. Graphics can be printed from 60 dots per inch to quadruple-density 240 dpi. Being Epson FX-80 compatible ensures that the MSP-20 works with most commercial graphics packages and word processors. Since the MSP-20 employs a parallel interface that accepts 7- and 8-bit words, it functions perfectly with just about any printer with a parallel port (a serial interface is available as an option).

Lately the features of dot matrix printers are becoming more and more homogeneous as manufacturers adhere to the Epson standard. As this happens, style, price, and durability become more important in determining which printer is right for your system. The Citizen MSP line of printers is certainly one of the most stylish on the market, and the fact that they are backed by a 180-day warranty certainly does not lessen their appeal. ■

Citizen Standard Mode
*Italic characters*
Expanded
Double Stike
Emphasize Typefaces
Standard underlining
$^{super}$Script Mode
$_{sub}$Script Mode
Condensed Print

**Print sample: correspondence quality mode.**

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Photography by Jeff MacWright.

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Xerox Advantage D-36 Diablo Printer

Xerox Advantage D-801F Diablo Printer

Xerox Advantage D-25 Diablo Printer

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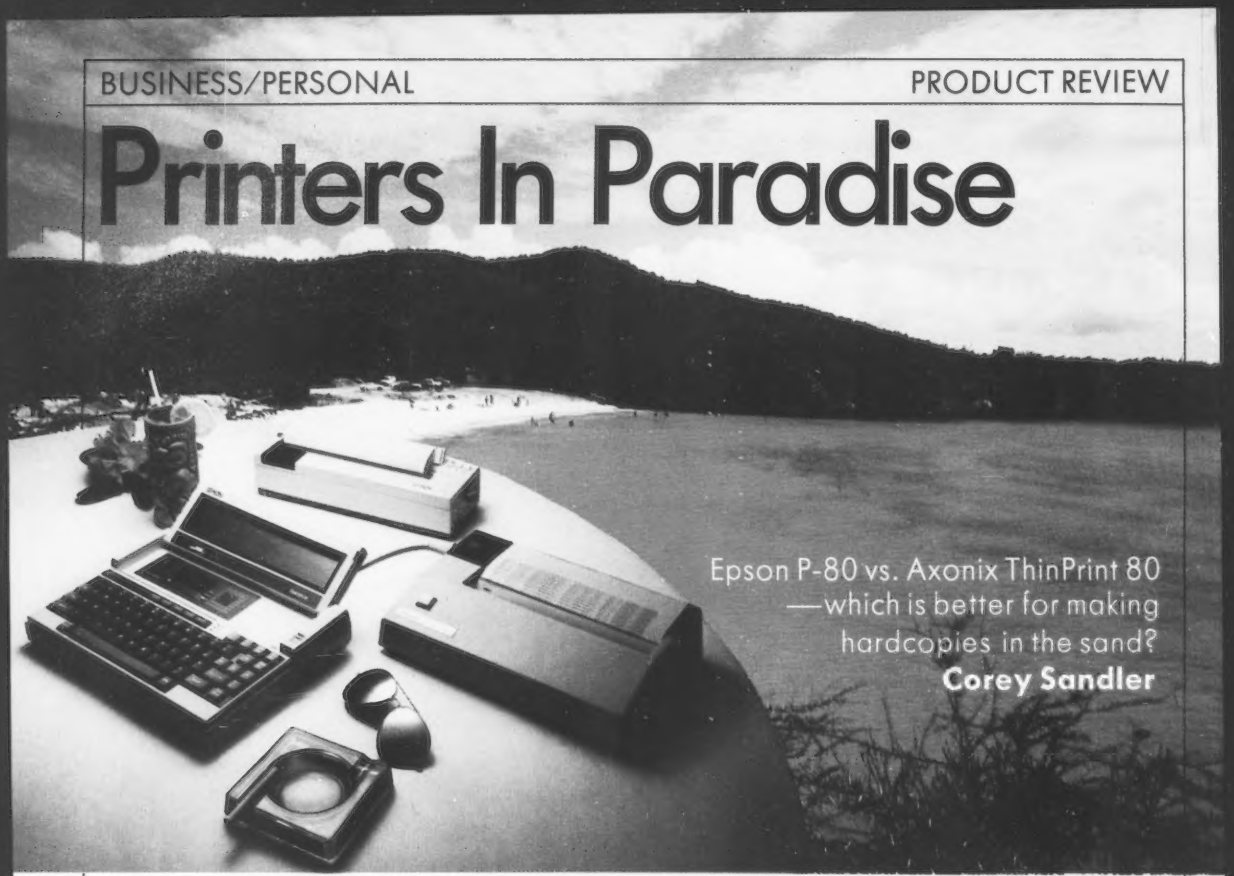
# Printers In Paradise



Epson P-80 vs. Axonix ThinPrint 80
—which is better for making
hardcopies in the sand?

**Corey Sandler**

If you had your choice of three things to take with you to a desert island, what would they be?

Well, I chose a brunette, a laptop computer, and a portable printer. It's not that I felt I really needed the electronic paraphernalia to entertain myself. It was just that I had a book deadline to meet, and I thought I would try to dive into the final rewrite between dives into the warm Caribbean surf.

The most difficult pre-trip preparation involved the selection of the proper portable printer—a device that had to combine light weight with heavy duty construction and easy operation under less than ideal conditions.

I returned to the States with a suntan, a completed book, and some hard-earned inside knowledge about travel with the still-unusual contents of my suitcase. I ran into several minor problems that the advertising brochures and your dealer might not warn you about, but I also found that it is quite possible to bring your electronic office with you on a vacation trip, if you must.

The starting point was my trusty Epson PX-8 lap portable, which I ordinarily use as a writing tool on the daily rail commute to my office. Its principal advantages for me are its relative feather weight—I only notice its five pounds in my briefcase at the end of a long day—and its use of a version of *WordStar* for files. I have a null modem plugged into the IBM PC at each end of the commute, and I can readily download or upload my work from one machine to the other.

Now, all of those specifics are not of real importance, since almost any of the existing laptop portables can be used in the same way, communicating directly or through the services of an intermediary electronic mail service for transfer of files. All you need is a portable computer with a serial or parallel port, a source of electrical power for recharging, a portable printer, and for stylish travelers, a modem for telecommunications.

On my desert island, though, there were a few problems. We were headed for Curacao in the Netherlands Antilles, a speck of sand about 35 miles north of Venezuela. To begin with, I had no reasonable expectation of finding a personal computer to rent or borrow there, so I had to rely on the Epson. The electrical current was just slightly odd—110 volts at 50 cycles, rather than the U.S.-standard 60 cycles—and that caused me some concern about recharging delicate electronic devices. Neither MCI nor EasyLink could promise me a telecommunications link from my personal computer, and besides the Dutch-designed telephone system on Curacao was, to be kind, *different*.

I could, of course, have relied upon the microcassette and mini-floppy storage capabilities of the PX-8 computer, but I had visions of airport X-ray machines and dirty-fingered customs agents wiping out a week's work on the trip home. I am also still accustomed to performing the final edit of any piece of writing on a printout.

I solved the electrical problem with a bit of research and some advance preparation. Both the printer I selected and the Epson portable computer use a 110-volt to 6-volt stepdown transformer for recharging batteries. According to electrical engineers I consulted, the slower cycle rate of the wall current might make the transformers run a bit hot and slightly slower than they would on their standard U.S. diet, but would not damage the computer or printer. (However, they did not advise plugging two transformers in series if you need a reduction from a 220-volt source to 110 volts. If you face that problem, check with the manufacturer for a 220-to-6-volt device.) Just to be on the safe side, though, I brought with me a small volt-

Background photograph courtesy Curacao Tourist Board. Product photo by Jeff MacWright.

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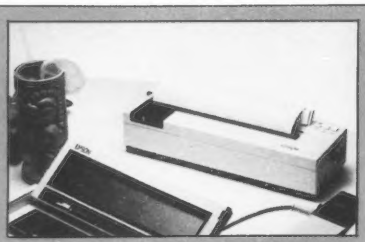

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## Hardware Profile

**Name:** Epson P-80 **Type:** Portable dot matrix thermal printer **Feed:** Friction
**Speed:** 45 cps **Interface:** Serial and parallel **Graphics:** 8 x 480 dots/line
**Character Sets:** 8 international **Logic Seek:** Yes, unidirectional
**Summary:** A real lightweight—in weight and output, but one that fits nicely in a briefcase.
**Price:** $249
**Manufacturer:** Epson America, Inc.
3415 Kashiwa St.
Torrance, CA 90505
(213) 539-9140

CIRCLE 405 ON READER SERVICE CARD

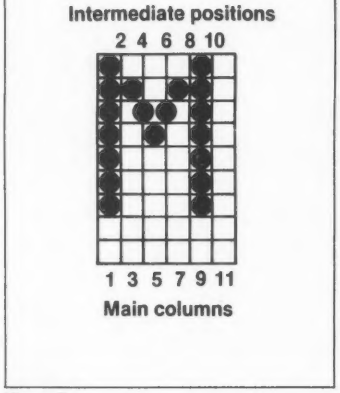



**Figure 1.**

age meter to test the current before I plugged the equipment into the wall.

(One other bit of advice for the high-tech traveler: bring with you copies of sales slips for major pieces of equipment and be prepared to explain to customs agents at your destination the reason you are bringing such devices into the country. You may also have to prove to American agents when you return that you did not purchase equipment outside of the country.)

My pre-trip comparison test examined two specialized printers aimed at use with portable computers: the Epson P-80 and the Axonix ThinPrint 80.

### The Epson P-80

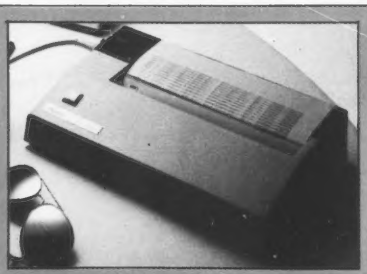
The Epson P-80 is the "official" portable printer for the Geneva computer. It is cute as a bug, weighing in at 2.4 pounds and filling out just 2.5" x 11.75" x 4.25"—not much larger than a fat paperback book. It has, though, accomplished its weight loss through an abundant use of plastics for the shell and almost all of its internal parts.

The P-80 connects to the computer through a serial port, using a special cable sold separately by Epson. The printer and cable should also work with other portable computers—enlist the aid of your dealer in making the proper fit.

The P-80 can print using either of two thermal methods. The printer head can scribe onto specially treated paper, or the device will accept a special mini-cassette with a thermal transfer ribbon that allows printing on standard smooth paper. The printhead yields type as it moves from left to right only. The claimed printing speed is 45 characters per second in the standard 10 pitch pica typeface; I would estimate that the real throughput under actual use is about half that.

The print quality of the P-80 seemed very un-Epson-like, looking more like a cheap imitation than the real thing. Epson has attempted to maximize the quality of output by using type styles with overlapping dots. The basic matrix for printing is seven dots high by five dots wide. At five dots in width, though, many characters lack detail, so Epson has designed its printer to fire pins at half-steps as well, resulting in a matrix grid that is actually 11 dots wide. (See Figure 1.)

Despite the technology, the type quality ranged from faint to merely acceptable using the thermal paper option; adding the ribbon cartridge improved the quality somewhat, but don't expect even near letter quality output from this tiny printer. The output improves when the printer is shifted into condensed mode, although this drops the side of the printing by half, with each character no more than .043" in width, .096" in height, at 17 characters per inch. Other available type sizes include single-



```
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
HNOPQRSTUVWXYZ[\]^_`abcdefghijklmno
```

## Hardware Profile

**Name:** Axonix ThinPrint 80 **Type:** Portable dot matrix thermal printer **Feed:** Friction
**Speed:** 40 cps **Interface:** Serial or parallel **Graphics:** 960 dots/line
**Character Sets:** 1 **Buffer:** 2K **Logic Seek:** Yes, bidirectional
**Summary:** Solid, silent companion to a portable computer **Price:** $339
**Manufacturer:** Axonix Corp.
417 Wakara Way
Salt Lake City, UT 84108
(801) 582-9271

CIRCLE 406 ON READER SERVICE CARD

strike emphasized, double-strike, single-strike expanded, single-strike expanded compressed, single-strike emphasized expanded and double-strike expanded. Each of these styles can also be printed in an italic face and underlined.

The printer comes with a built-in set of four NiCad batteries and an external recharging transformer. Epson claims a set of fully charged batteries can produce 60,000 characters, or about 30 single-spaced pages of type. The battery recharges in six to seven hours, or the printer can be used with the AC adapter connected as a battery replacement. The optional ribbon cassette has a claimed life of 40,000 characters, or 20 single-spaced pages. A built-in buffer has a memory of 240 bytes, or about two lines—more than sufficient to keep the printer chugging along but not enough to free up the computer for other tasks while the printer is working.

The P-80 is designed to accept single sheets of paper only, with no provision for a roll holder or a convenient way to spool up output. Sliding plastic guides will accommodate paper from 5.5 to 8.5″ in width.

A pair of DIP switches are located on the rear panel of the printer, and the manual includes simple instructions to select international character sets, auto linefeed setting, and the RS-232C serial protocol. As delivered, the printer is set up for use with the Geneva computer, at 8-bit data length, no parity check, odd parity, 2-bit stop bit code, and 4800 baud. The simple control panel on the front consists of an on/off switch, on line button, and paper feed switch. On the side of the printer is a "density" switch, a rotary adjustment that had a minor effect on print darkness. The dial has to be set with the power off. A self-test can be run by holding down the paper feed button while the power is switched on.

The P-80 can reproduce 126 characters, including simple ASCII graphics characters. The printer can also be directly programmed with dot-addressable graphics in single- or double-dot density.

As you might expect, the Epson printer works well as a team with the Epson computer. P-80 control codes can be accessed from within the *Portable WordStar* program of the PX-8. Other computer/word processing combinations can use ESC commands, patches, or Basic programming to address the printer.

In summary, the P-80 is a capable printer, one of the smallest and lightest on the market, and preconfigured to work with the PX-8 and *Portable WordStar*. The output quality, though, is merely acceptable. Although my Geneva computer has stood up well to six months of commuting and business travel, I wonder if a PX-8 could do the same. As I tested the printer, I had some serious doubts about its long-term ability to survive in a briefcase.

## The Axonix ThinPrint

My description of the perfect portable printer was met almost exactly by a silent, solid device manufactured in the far-off land of Salt Lake City, UT, U.S.A. The Axonix ThinPrint 80 does not win the contest for size or weight—it has almost twice the weight and volume of the Epson model, at nearly five pounds with batteries, and 2.5″ x 7.5″ x 11.5″ in size. But the case is made of shaped metal, and the back end of the unit includes a compartment that can hold a full 80′ long, 8.5″ wide roll of thermal paper.

In operation, the ThinPrint is all but silent, the only sound a slight rustle as the paper is advanced at the end of each line. The thermal printhead puts down characters in both directions, in a sharp, black image. There was an occasional smudging of characters, but overall the printing was quite readable.

The ThinPrint offers a 95-character ASCII set, produced with a seven-dot printhead in a 5-by-7 dot matrix box. Normal print pitch is 9.6 cpi; compressed is 16.5 for 136-column printouts. As with the Epson P-80, there is no way to confuse the output of the ThinPrint with that of a fine letter quality printer or even most full-sized dot matrix devices. However, the text is quite readable and will certainly meet the needs of most portable office users.

With any thermal printer, it is important to obtain the right paper. All of the papers I used tended to curl noticeably—I had to press some printed sheets overnight under a heavy book to flatten them. Axonix specifies 3M Type 459 or Apple Silentype paper. I also tried the IBM PCjr printer paper with acceptable results. Using the wrong paper can yield poor image because of differences in image development temperature.

The claimed printing speed is 40 cps, and I would estimate the ThinPrint is fairly close to that number in real use. Axonix offers two models, the 80S with serial interface and the 80P with Centronics parallel. I tested the serial model with the Epson portable. The serial interface receives data at any of four rates selectable by internal slide switch: 300, 1200, 2400, or 9600 baud. Other switches select Xon/Xoff or DTR Handshaking, and between RS-232C or inverted TTL signal levels. Axonix offers a number of special cables for IBM, Apple, and Commodore devices, as well as a null modem cable and an unterminated ribbon cable for wiring your own. The standard Epson serial cable plugged into the Axonix without problem; if you use the Epson RS-232C cable, the two devices will not communicate properly.

Axonix will provide on request a microcassette tape with a small program to adapt the Epson's *Portable WordStar* to provide the proper linefeed coding. The program is copied from the Geneva's microcassette drive into RAM and is used to load *WordStar*.

ThinPrint controls include an on-off switch, lighted on-line button, and contrast adjustment. A slide switch on the system board can set compressed or standard type as default setting. That option can be altered by commands from software or with an ESC code. The on-line pushbutton can also be used to wipe out the contents of the 2K (2048-character) input buffer, and initiates the self-test when depressed as power switch is turned on.

## And the Winner Is . . .

I took the Axonix printer with me on an all-expenses-paid trip to Curacao. It settled in nicely in my briefcase, along with the Epson PX-80 computer, a few extra rolls of thermal paper, and various battery recharging devices. Over the course of the week, the ThinPrint proved its worth, cranking out chapters on a beachside table. Its extra weight and bulk paid their way in sturdiness.

Were Epson to add a few ounces in a stronger shell to its P-80 printer, make the device bidirectional to pick up a bit of speed, improve the density of printing, and offer some kind of bracket to mount a roll of paper, Axonix would have a tough lightweight challenger. ■

As we went to press, Epson America announced an upgraded version of its tiny printer, the PX-80X. According to the company, the new model—not yet seen by us—can produce letter quality output at 23cps and draft printing at 45cps. List price of the new model is $379.

*Announcing*

THE NATIONAL HISTORICAL SOCIETY

# CIVIL WAR CHESS SET

**Richly detailed portrait sculptures of great American heroes —in solid pewter, solid brass and fine enamels. An heirloom chess set to be enjoyed for generations. Created by the world-famous craftsmen of The Franklin Mint.**

THE NATIONAL HISTORICAL SOCIETY is dedicated to bringing the excitement and power of American history—as well as its significance—to people in every part of the land.

It is in keeping with this purpose that the Society is about to issue its own Civil War Chess Set. A dramatic tribute to the heroes of both North and South—and a work all the more intriguing because the playing pieces include richly detailed three-dimensional *portrait sculptures* of the great Generals of Union and Confederacy, captured for the ages in solid pewter, solid brass and fine enamels.

This extraordinary new chess set will be crafted to the highest standards of quality and historical authenticity. The National Historical Society has appointed The Franklin Mint to create the sculptures, each of which will be a new and original design. Some figures will be shown standing, some seated, some kneeling, some mounted on horseback. And each figure will be painstakingly crafted of solid pewter, hand-finished, then set atop a solid brass pedestal base embellished with a circular band of richly colored enamel—*blue* for the soldiers of the North, *gray* for those of the South.

Every sculpture, moreover, will be so rich with authentic detail that only the artists and master craftsmen of The Franklin Mint, steeped as they are in the tradition of *precision coinage,* could have achieved it. Indeed, every nuance of facial expression, uniform and weaponry—right down to the buttons, braiding, sabers and carbines—will be depicted with meticulous accuracy.

Thus, The National Historical Society Civil War Chess Set is also a magnificent *collection.* A triumphant achievement of portrait sculpture—and the ultimate in micro-detailed miniaturization.

ALL FIGURES SHOWN ACTUAL SIZE.

Major General
William Tecumseh Sherman
BISHOP

General in Chief
Ulysses S. Grant
KING

General in Chief
Robert E. Lee
KING

Major General
J.E.B. Stuart
KNIGHT

**Available only by direct subscription. Issue Price: $17.50 per sculptured chess piece. Limit: One complete set per subscriber. Please enter your subscription by August 31, 1985.**

U·M·I

READER SERVICE CARDS 55-56 ARE MISSING.

This handsome pewter-finished chessboard and fitted presentation case will be provided as part of the set.

### A dramatic showpiece for your home or office

The chessmen themselves are scaled so that each one will suit the function assigned to it in the game of chess. And the handsomely crafted, pewter-finished playing board has been sized with equal care. Specially fitted, to also serve as the cover for the case which will house all 32 playing pieces, the board completes a presentation so attractive that the chess set will be played and displayed with pride and satisfaction. A Certificate of Authenticity, and specially written reference materials, will also be provided.

Exhibited on a table or cabinet in your living room, family room, den or office, this is a possession certain to evoke both admiration and respect from all who see it. A unique tribute to unique Americans. A work of heirloom quality, that will bring you endless pleasure through the years. And a chess set eminently worthy of being passed on from generation to generation.

The subscription rolls are now open. The work may be obtained *only* by direct subscription, with a limit of one complete set per subscriber.

The chessmen will be issued to you at the attractive price of $17.50 each, with the specially designed playing board and protective case provided at no additional charge. As a subscriber, you will receive two sculptured pieces every *other* month. You will, however, be billed for only *one* chessman at a time—a total of just $17.50 per month. In addition, you will have the option to complete your set earlier, if you wish—but you will be under no obligation to do so.

Here, then, is a work that will bring lasting pleasure to chess enthusiasts, history buffs, collectors of military miniatures—to anyone who appreciates our nation's heritage. Indeed, it is an unmistakably American chess set, that will make a dramatic addition to any room. And an exciting showpiece that will be displayed, enjoyed and treasured by each succeeding generation.

To acquire The National Historical Society Civil War Chess Set, no advance payment is required. But please note that the accompanying Subscription Application is dated and should be returned postmarked by August 31, 1985.

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SUBSCRIPTION APPLICATION

The National Historical Society

## CIVIL WAR CHESS SET

*Please mail by August 31, 1985.*

The National Historical Society
c/o The Franklin Mint
Franklin Center, Pennsylvania 19091

Please enter my subscription for The National Historical Society Civil War Chess Set, consisting of 32 chessmen.

I need send no money now. I will receive two new playing pieces every *other* month, but will be billed for just one piece at a time—$17.50* per month—beginning when my first shipment is ready to be sent. I will receive the fitted presentation case and pewter-finished chess board at no additional charge.

**Plus my state sales tax and $.50 per chessman for shipping and handling.*

Signature_____
ALL APPLICATIONS ARE SUBJECT TO ACCEPTANCE

Mr./Mrs./Miss_____
PLEASE PRINT CLEARLY

Address_____

City_____

State, Zip_____

*Limit: One complete set per subscriber.*

Canadian residents will be billed $49. (Cdn. $) for each shipment of two chess pieces, payable in two equal monthly installments, with the first payment due prior to shipment.

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CIRCLE 111 ON READER SERVICE CARD

# Minding Your Money

## Financial management packages for personal computers

/Corey Sandler

If you could show me a man or woman whose checkbook is always in balance and whose personal financial budget is always on target, I would write you a check for a four-course dinner. That is if there's enough money left in my own account—I lost track of the bottom line some time last August.

There's something about low finance that confounds most of us. I usually forget to record at least one check a month; my wife specializes in creative mathematical concepts.

And so, it is not surprising that one of the most popular categories of personal software for microcomputers is the electronic checkbook balancer. There are, I believe, three reasons for this: first, almost every rec room programmer since the first micro came home has written one, and half are still on the market; second, almost every owner of a microcomputer at home has settled upon the checkbook balancer as the answer to the question, "But what does it do?"; and third, there just may be a real service that a comprehensive checkbook program can perform for you.

### From Simple to All-Encompassing

Check programs range from modest and unassuming to the electronic equivalent of the Swiss Army Knife. And programs are available for almost every brand of microcomputer. In this article (and in the accompanying review by Ken Uston) we'll look at a number of selections from three categories:

- Checkbooks on disk. These are essentially simple calculators and one-dimensional databases. Such programs allow you to open up your checkbook file (or a savings account or other asset account) and add or subtract deposits or withdrawals. Amost all of these simplest of programs allow you to allocate income or expenditures to a particular budget line, and you can track income and outgo according to those categories.
- Personal finance managers. These are simple calculators with relational databases or other designs of linked files. Many of these programs also compete on the basis of bells and whistles and grandiose capacities. Budget tracking usually includes charting and graphing, color displays (red phosphor instead of red ink), and the ability to track expenditures or income across several different asset or liability accounts. Some also allow you to print checks on special stock.
- The Everything You Ever Wanted to Know About Personal Finance claimants. Most of these include all the features of the advanced calculator and relational database, and add into the mix as many related financial measures as the author can imagine or fit on a disk. Some programs include mortgage amortization tables, life insurance and annuity calculators, personal inventory and net worth databases and calculators, loan comparison algorithms, future value of money programs, and other goodies germane and obscure. One program (otherwise forgettable and not reviewed here) includes amongst its bells a set of musical selections, including "We're in the Money."

Are the programs of value? On the face of it, there would seem to be no doubt that almost any personal finance program can be of assistance to any individual or family in managing income. Nearly all of the authorities on personal finance say that establishing a budget (or tracking expenditures and income after the fact on the basis of meaningful categories) is a critical first step in understanding the true nature of your finances. And it is almost certainly true that using the computer as a high-priced adding machine and filing cabinet will help you be more accurate in your math and more reliable in your collection of important personal and tax-related data.

But, you must use the program. First off, you have to spend the time to

collect all of the information on your various bank accounts, money market deposits, salary, and other income sources. You have to determine which expenses you want to track and in what degree of detail (some of the programs want you to record the disposition of every penny of pocket change, a depressing prospect for disorganized folk like me.)

And then you have to have the discipline to sit down in front of your computer every day, or once a week, or once a month, and spend the time to record and allocate all of the checks, deposit slips, and income credits.

If it is a habit you can establish, then you are quite likely to derive real benefit from a personal finance program. I have found using such programs to be a bit of a chore, and my dedication to them uneven. However, my accountant was very impressed with the paper I presented him at tax time, and so too was the mortgage banker struggling to understand the complicated finances of a freelance writer with 20 different sources of income in a typical good year. (The fact that a computer-printed financial report is not necessarily any more accurate than a hand-scribbled note on a yellow legal pad is almost always overlooked by normally hard-nosed accountant types. It just looks so very important.)

The real key to a successful home finance program, in my opinion, is the degree to which the program can be the expert's opinion of the most logical way in which to organize income and outgo; other programs represent some programmer's idea of the best way to organize a piece of software. In either case, the program may have little to do with the way in which you keep track of your financial status.

For example, I don't want to have to change the way in which I record expenses and deposits. I want to be able to jump around from one income source to another or from one asset account to another. I keep four different checking accounts for various purposes and several mutual fund and investment accounts, and I switch from one to another regularly. I have several tax deductible activities, but I need to consolidate all of the elements on one statement.

If all this sounds like an argument not to use a personal finance manager, it is not meant as such: just do spend the time to sit down and think through what it is you want a program to do for you, and then give some consideration to the nature of your finances and the way in which you spend your money. After that is done, try to find a program that will computerize your record keeping in a manner that is consistent with your way of doing business. Some of the packages here are available in demonstration versions; others can be previewed at your dealer.

## Certified Public Accountant

This product is hereby certified as worthy of consideration for IBM PC users. This is a full-featured personal budgeting and checkbook accounting package that is as fast as any I have worked with and possessed of enough intelligence and thoughtful organization to make learning and use relatively painless.

The program divides up your various current asset accounts into electronic folders and then allows you to enter quickly dates, amounts, budget categories, and notes within each account. The program displays a running balance for each account as changes are made. The program requires you to enter just enough information to distinguish one category from another—CH (in upper- or lowercase characters) signifies checking: A 30 85 is sufficient information for the computer to figure out you mean April 30, 1985. You can also cycle through all available categories by hitting the spacebar before entry—when you see the one you want, just hit Return to accept it.

The 200-page printed manual is quite easy to use, but the program also provides for on-line help at the press of a ? key. The program will display in 40- or 80-column mode, on a monochrome or color RGB monitor. The software is not copy protected and can be run off a hard disk. I tested *CPA* using an IBM PC-XT, and the program practically flew along on autopilot. On a 128K PC, the program will allow as many as 100 asset accounts, 100 budget categories, 20 credit card, checking, savings, or money market accounts, 100 liabilities, 50 stock holdings, and 50 tax categories. A standard disk will hold at least 1000 entries, and a hard disk, many more than that.

Among reports produced by the program are the status of particular asset accounts, expenditures and income by category, and a personal balance sheet that includes dollar values and a percentage of the whole calculation for each element. The package will transfer data to other members of the Sundex family, including *Certified Personal Investor* and *Personal Payables*.

## Dow Jones Home Budget

This product fits into the assets account.

As befits its conservative parentage, this is a capable, pin-striped and rep-tie home accounting program. (I kept expecting to find "Polo expenses" and "Alligator shirts" under budget categories.) There is no color, no beeps and buzzes. What you get instead is like the inside pages of the *Wall Street Journal*: straight to the point, strictly business accounting.

The program allows construction of a database of as many as 200 accounts, which can be subgrouped under 63 different codes. For example, you could establish a House category and subdivide it into mortgage, insurance, maintenance, furnishings, and other expected expenses. The program will store as many as 2500 transactions on a single floppy disk, more on a hard disk.

```
TRANSACTION #  418
LAST TRANSACTION ENTERED  5 / 31
ENTRY DATE: MAY  31
DESCRIPTION       GAS FOR NISSAN
                  ---------------
DEBIT ACCOUNT     AUTOMOBILE-
CREDIT ACCOUNT    CASH-
AMOUNT                      23.32
CODE
```

**Figure 1. The transaction form from Dow Jones Home Budget.**

Based around classical double entry bookkeeping, the program calculates the bottom line on the basis of the formula: Assets = Liabilities + Reserves. Assets are any current or fixed asset, including investments and property; liabilities include loans, credit cards, accounts payable, and taxes payable. Reserves are accounts that indicate how the total assets are being allocated—mortgage, utilities, food, clothing.

The program is not copy-protected and can be run from a hard disk after the DOS ASSIGN command is used to fool the computer into thinking that the C or D drive is the same as the A or B looked for by the program.

All moves within the program are made from menus with single character choices: A for account names, B for balances, D for built-in desktop calculator, etc. The transaction form is similarly direct (see Figure 1).

You are asked before the Description line whether you are entering an Increase or a Decrease in an account (entries can be made in any order). To

enter an automobile expense, you could type in AUTOMOBILE, or enough of the name to make it recognizable by the computer, in this case AU. You could also enter the account code number. If all else fails, striking the Return key brings you to a listing of all available codes.

The program will print out on-screen, or on a printer, a complete balance sheet or a category by category statement. A set of very simple ASCII character graphs can also be called for to show whether particular budget lines are in balance or to chart cash flow. There is also a mini-database retrieval segment that allows you to search for particular items—the command structure is, like much of this program, very severe and demanding.

I found this program to be a fully capable, solid, and dull companion for my IBM PC.

### Peachtree Home Accountant/Finance Manager

*The Peachtree Home Accountant* is a peach of a program; and the HesWare *Finance Manager* makes a pair. I took a look at the Peachtree product early on in my tour of these products and liked it. A few weeks later I received the *Finance Manager* and liked it, too. It took about ten minutes before I realized that they were nearly identical. A call to HesWare confirmed the common software; I will refer to both products as if they were a single program.

The program is a very intelligent, intuitive system. Throughout the package you have only to enter enough of a code or a date to distinguish the entry from other similar listings. If you have an account called CHECKING and one called CHASE MANHATTAN, the program will accept CH (or ch) as input and then ask which one of the possible selections you want. Similarly, d 12 84 is sufficient for the program to figure out that you mean December 12, 1984.

The program is built around a single basic transaction screen, which is used for expenses, deposits, and transfers (see Figure 2 on page 62).

If I had wanted to post income, I would have listed in the TO category the code name for a checking account and in the FROM category the code for a source of income such as salary, interest, blackjack winnings, or whatever.

Reports include a detailed listing of income and expense by month or for the

*(continued on page 62)*

# A Former Financier Looks

## Ken Uston

*Ken Uston, former vice president of the Pacific Coast Stock Exchange (and, incidentally, the world's foremost blackjack player) seemed a logical choice to evaluate two of the best-selling personal finance packages. He has had a great deal of experience with complex personal finance situations and he enjoys making computers work for him. Let's see what he has to say.*

### Managing Your Money

It is truly a pleasure to work with *Managing Your Money*. This program is without exaggeration *the* easiest-to-use program I have ever encountered (and I have tested hundreds over the past year).

*MYM* is also fun to use. The investment expert, Andrew Tobias (author of the best-selling book, *The Only Investment Guide You'll Ever Need)*, wrote all of the text for this program. Tobias's breezy, humorous style is refreshing and reassuring ("the first thing you need to know is that there is practically no way you can screw things up . . . . . ")

*MYM* does far more than simply perform the conventional home finance functions of keeping a budget and balancing a checkbook. It tracks net worth, evaluates life insurance needs, calculates gains and losses on investments, suggests income tax strategies, and even prints out your IRS Schedule D. *MYM* can also be used to calculate tax shelter and rental property rates of return.

*Managing Your Money* is designed to be used without a manual; all the information you need is on the disks. Many software packages make this claim, but *MYM* actually succeeds.

*MYM* is a set of seven inter-related programs. You have the option of using some or all of the programs. The seven are: Reminder Pad, Budget And Checkbook, Income Tax Estimator, Insurance Planning, Financial Calculator, Portfolio Calculator, and Your Net Worth.

*MYM* also has an index, which has such interesting references as Fake Disks For Cocktail Parties ("if you want to show your friends how the program works without letting them see how rich you really are . . . or aren't . . . just make up a new set of disks and fill [them] with harmless understatements or exaggerations. When guests come, you can pretend you left the machine on by mistake.").

What I particularly enjoy about *MYM* is that it is just about impossible to get lost while using it. Nearly every time you have to do something, the options are listed at the bottom of the screen. For example, when you are asked for your "financial station," you have several choices, including Forbes 400, Wealthy, Rich, Well Off, Comfy, Getting By, Pinched, Squeezed, Squirming, and Bereft.

The program is chock full of interesting information—some of it totally off-the-wall, such as a list of U.S. presidents and their cause of death (did you know that George Washington died of acute laryngitis, and both Thomas Jefferson and James K. Polk were done in by chronic diarrhea?).

Once you enter information for one section of *MYM*, the other sections automatically pick up that data. For example, if you write a $75 check to the Red Cross, the tax program knows that you have a $75 deduction, and the net worth program knows that you are 75 bucks poorer.

Following are descriptions of the seven programs.

**Reminder Pad.** You enter all important annual events (birthdays, anniversaries, etc.) just once. They are automatically updated so that you will be reminded of them every year for the rest of your life. One-time reminders, which disappear after the date on which they occur, can also be entered.

You are also given a "warning day" option. For example, if you entered a November 15 reminder with 15 warning days, the reminder would start appearing on November 1. An annual reminder would start appearing on November 1 of each following year.

*MYM* also generates its own reminders, such as when your stocks are approaching long-term capital gain status, or when they have achieved your price objectives.

The reminder pad also gives you advice with periodic little gems, such as, "There is no dignity quite so impressive, and no independence quite so important,

# At Two Best-Sellers

as living within your means."—Calvin Coolidge.

**Budget and Checkbook.** This section can be used to make cash flow projections, make a personal budget (optional), print checks, and keep track of expenditures by category. It is about the easiest and most comprehensive budget and checkbook program I have seen. It has dozens of pre-defined budget categories, which can be easily augmented or deleted.

Checks and window envelopes can be ordered so you can print checks and avoid addressing envelopes.

**Income Tax Estimator.** This program takes information from elsewhere in the program, asks you for additional detail, and tells you where you stand with the IRS at any time during the year. You can also enter hypothetical information to answer "what if" tax questions.

**Life Insurance Planning.** This program tells you how long you are likely to live, calculates how much life insurance you need, and tells you how much the insurance should cost.

In the life mortality sections, you enter your age, overall health, lifestyle ("homebody," "average," or "wild"), the percentage of time you use auto seat belts, and other factors. The message you receive looks something like this:

"Your odds of dying this year are less than 4 in 1000. Your life expectancy is about 39 more years for a total of 78 years. Even so, you may need life insurance. To see how much, press F2."

**Financial Calculator.** This program is basically a pocket calculator with helpful prompts. It also helps you plan for retirement. Because *MYM* makes it so easy to compute the value of future savings and payments on loans and annuities, you are motivated to consider these factors and thus become a better financial planner.

The retirement program factors in such variables as taxable savings, pension plans, IRA and Keogh holdings, inflation rates, and your income tax bracket. It also offers gentle advice such as:

"It's not a cinch to outpace inflation by even 3% over the long-run. You have chosen yields that outpace your inflation assumption by more than 5%. We hope you're successful, but if you wish to change your entries, do so now".

**The Portfolio Manager.** This section keeps track of your investments. If you don't own stocks and bonds, but want to see how you would do with a hypothetical investment fund of, say $100,000, *MYM* will analyze your portfolio.

**Your Net Worth.** This program draws from all the other information in the program, asks you additional questions, and calculates your net worth.

Thus if you happen to need a statement of net worth for a bank loan or whatever reason, one quick print-out, and you are in business.

## Summary

If you've been thinking "One of these days, I've got to get my finances in order," *MYM* just might be the program that will finally get you organized.

You will have to devote a few hours to getting started, and you'll need the self-discipline to put in an hour or so every week or two. But if you do it right, not only will you be able to save on taxes and other expenditures, but you could also do a much better job of providing long-term security for yourself and your family.

And you can use the program without fear. As *MYM* reminds us, "Remember, you can do almost nothing wrong. So don't be afraid to experiment. If you hit a wrong key, your machine will simply burp and wait for you to hit one that makes sense."

## Your Personal Net Worth

The objective of *Your Personal Net Worth* is to do what *Managing Your Money* does, but in a totally different way. For one thing, *NW* stresses that you *must* read the manual. Unfortunately, the manual is like an accounting textbook, full of big words, accounting jargon, flow charts, and a chart of accounts.

*NW* is also a series of several interrelated programs that keep track of your bank accounts, your budget, and your investments and savings. You are provided with income statements, statements of net worth, a report of your credit card activity, a stock portfolio, and an inventory of your personal belongings.

Getting started with *Your Personal Net Worth* is like studying for an accounting exam. You have to learn about things like temporary journal files, basic financial modules, and posted history files.

There are dozens of pre-assigned budget and other accounts, which are helpful. *NW* even has categories set up for American Express, Visa, and MasterCard. Also nice (if you happen to have a color monitor) is that the screens appear in living color, and you can easily change the colors of the border, background, and headings to suit your personal proclivities.

The program has a helpful menu system, which, combined with the judicious use of function keys, makes it easy to move from one section to another. But making the entries is far more difficult than with *MYM*, and the resulting reports are less helpful.

*NW* has an on-screen tutorial, which is supposed to make things easier. But the information in it is dry and boring, with none of the humor or interesting side comments of *MYM*.

Although the tutorial is somewhat easier to understand than the manual, that is no solace, because you are told *not* to use this information in lieu of reading (i.e., studying) the manual.

You get a free copy of an abridged version of *Sylvia Porter's New Money Book For the 80's* (the original, we are told, costs $24.95). When I saw the 1975, 1979 copyright to the book, I was a bit skeptical of the timeliness of this book for the 80's. Then I noticed that the first printing was in November, 1980 and felt a little better.

The tutorial states that the purpose of *NW* is to "provide a comprehensive, integrated, menu-driven, home accounting application package that is easy to use." On a scale of 1 to 10, I would rate the achievement of these objectives as follows:

- Comprehensiveness 5
- Integration 6
- Menu-driven 8
- Easy to use 3

In short, *Your Personal Net Worth* will do the job, but it requires lots of effort and getting used to, it is a real chore to set up and not nearly as helpful as *MYM* (which, in my opinion, rates 9s in all the above categories). ■

```
          Date  March 3, 1985                    Transaction #
   TO Category  Freelance - Office
        Amount  $      1,045.35      $          0.00      $
  Tax Schedule
    Tax Amount  $         83.47      $                     $
 FROM Category  Special account Chas
        Amount  $      1,045.35
  Tax Schedule
    Tax Amount  $
          Memo  Potted plants for reception area
  Name Paid To  Ace Reception Area Potted Plant Co.
        Street  Two Park Avenue
  City, State   New York, N.Y.
     Check #    234
    Cleared?    no
```

**Figure 2. The transaction screen from Finance Manager.**

entire year, a net worth listing that includes book value and market value for assets, and a posting of all accounts.

The weak point of the program would be in use as a daily checkbook balancer. Current balances are not listed on screen as deposits and expenses are posted. Instead, you must exit the transaction screen to look at a balance sheet for that information. However, I found the simplicity and logic of this program, with its related ability to work with the tangled mess of my personal finances, to be very attractive.

Both programs come with capable manuals; HesWare's *Finance Manager* would seem to have a slight edge in this department. In addition, HesWare provides two copies of the program while Peachtree offers just one. With either program, the system can be run from a hard disk, although the original floppy disk must be present in a drive for copy protection purposes.

## Your Money Matters!

This is one from the rec room. It will accomplish the tasks you ask of it—simple account management and checkbook balancing, but no home budgeting—but it is very insistent that you do your work its way. That way includes the use of numbers or precise names for accounts; an insistence on very precise entry of dollar values without dollar signs or commas; and no on-screen help. The "complete user manual" advertised is a 12-page instruction pamphlet of minimal assistance.

I was surprised to find that the program would accept incorrect dates—my entry for the 32nd of December was eagerly swallowed up by the Apple IIe on which I tested the program. The program also hung up when I directed it to print something without having first turned on my printer. There was no way out but to shut off the computer and dump the contents of RAM into the ether.

Data disks from *Your Money Matters!* can contain as many as 50 accounts and 2800 entries. The single entry system allows for flexibility in determining your own system, if you can get it to work within the framework of the product.

## Complete Personal Accountant

The version of the *Complete Personal Accountant* I reviewed lives up to its name, within the limits of the Commodore 64 computer. As anyone who has ever used a C64 can attest, the disk drives on the unit are not exactly gazelles in flight—they are more like crippled turtles. And this product makes many disk accesses for its full menu of features.

The program is available in various modules. The deluxe set for the Commodore includes a double-entry checkbook register and balancing program, an asset management segment, the ability to print checks, a personal budgeting module with graphic display of goals and reality. Also included are a mailing list manager, a payments calendar to alert you to bills due, and a personal appointment calendar. The 190-page instruction book is clearly written and well organized. As many as 99 accounts and 300 sub-accounts are allowed—the program comes with a "standard" chart of accounts which can be used or adapted to your needs.

Each of the modules is swapped in and out of memory from disk as needed—the best use of your time would be to plan ahead and do all of your calendar work at one time before moving on to the disk drive for the checkbook or assets module.

All selections are made from a logical on-screen menu of options. The program includes a wide range of maintenance options, including the ability to delete, add, or rename accounts during the course of a year. The checkbook and other accounts can be searched by date, amount, or other element of the record. Two additional modules, not reviewed, are available to tie into this product: a spreadsheet to perform "what if" financial analysis, and The Tax Handler to assist in tax computations.

This product offers a lot of bang for the buck of a Commodore 64 owner.

## Personal Accountant

*Personal Accountant* is a simple double-entry accounting system that is reasonably simple to use. It is also the only product of this group that is also available in a cassette version, for use with the Commodore 64 machine. Use with the tape, though, will prove quite frustrating if you have very much data—the serial storage on a tape (one bit after the other) makes for very slow and inefficient retrieval and updating of information in comparison to a floppy disk drive—even Commodore's aforementioned slow drives.

In a double-entry system, you must enter a source of income and a place of expenditure for every transaction—what the accountants call credits and debits. The system can make eminent sense in simple applications, but money transfers and credit purchases can easily complicate the system. For example, a grocery store bill is debited from the checking account balance and credited to the food expense account. That is easy enough to follow. But if you were to borrow $8000 for a car, you would be crediting a loan account with the amount of the loan; each payment would be a debit from the loan account and a debit from the checking account.

As befits its humble aims and the limited memory and capability of the Commodore machine, the *Personal Accountant* is very demanding in the nature of entries. Dates must be entered as six-figure numbers: 040185 for April 1, 1985. Amounts must be entered without commas. Names of accounts must be entered precisely as stored, or the computer will not recognize them or will assume you are opening a new account.

A floppy disk can store as many as 4000 entries in any of 144 accounts. The cassette can store the same number of entries, dependent upon the length of tape and the number of accounts identified. The cassette operating system offers the option to subdivide the tape into 44, 70, or 144 accounts.

Also included in the program is a

simple loan amortization calculator and a database for storage of names and addresses.

The program works, within its limited bounds. Commodore owners with minimal systems might question whether the software on cassette is really easier to use than a three-ring binder—although a three-ring binder won't impress the neighbors quite as much as an electronic program, no matter how slow.

### Checks & Balances

This is another refugee from the plastic baggie school of computer programming (well, yes, it does come in a vinyl case, but packaging isn't everything).

*Checks and Balances* is a very limited, sometimes dense checkbook and budgeting program. Its claim to fame is that its on-screen displays include a full-screen editor allowing you to make changes, additions, or deletions anywhere on the screen prior to posting. The process moves fairly quickly, though, once you have figured out the structure of the package.

The manual won't give you much help. In addition to mixing CP/M and MS-DOS instructions in the same slim volume, the book offers very little in the way of an overview of procedures. I was able to load the package (it is copyable and can be run from a hard disk) and figure it out for myself, but then again, I had just finished looking at ten other packages and had financial programs on my mind.

This program has all of the necessary elements of a home financial package, including a Rolodex for storage of names and addresses and the ability to print checks. Its on-screen check register is starkly simple, and its limited database will do what is necessary for users familiar with simple searching techniques.

Missing is the polish and style of a commercial product and the acknowledgement that some of us are not computer programmers (and that those who are may not care to become involved in the structure of a checkbook balancing package). I can't recommend this product in comparison to other IBM programs, unless price is everything (in which case you probably need a very capable financial program to keep track of your small resources). It is the only program reviewed here that claims a CP/M version, which could make all the difference if you own a CP/M system. ■

# Personal Finance Software

| Name<br>System<br>Price | Manufacturer |
|---|---|
| **Certified Personal Accountant**<br>IBM PC, TI Pro, Sanyo: $149.95; Apple II: $99.95; C64: $79.95 | Progressive Peripherals/ Sundex, Inc.<br>2186 S. Holly, Suite 200<br>Denver, CO 80222<br>(303) 759-5713 |
| CIRCLE **407** ON READER SERVICE CARD | |
| **Dow Jones Home Budget**<br>IBM PC: $139 | Dow Jones & Co., Inc.<br>P.O. Box 300<br>Princeton, NJ 08540<br>(800) 257-5114<br>(609) 452-1511 |
| CIRCLE **408** ON READER SERVICE CARD | |
| **Peachtree Home Accountant**<br>IBM PC: $140; C64: $75 | Peachtree Computer Products<br>3445 Peachtree Rd., N.E.<br>8th Floor<br>Atlanta, GA 30326<br>(404) 239-3000 |
| CIRCLE **409** ON READER SERVICE CARD | |
| **Finance Manager**<br>IBM PC: $139.95; Apple II (64K): $99.95; C64: $69.95 | HesWare<br>150 North Hill Dr.<br>Brisbane, CA 94005<br>(415) 468-4111 |
| CIRCLE **410** ON READER SERVICE CARD | |
| **Your Money Matters!**<br>Apple II: $99.95 ($79.95, mail order) | Klug Computer Software<br>1730 Arlington Dr.<br>Oshkosh, WI 54901<br>(414) 235-6205 |
| CIRCLE **411** ON READER SERVICE CARD | |

| Name<br>System<br>Price | Manufacturer |
|---|---|
| **Complete Personal Accountant**<br>C64, Atari, Radio Shack Color Computer, Vic 20: $79.95 | Futurehouse<br>310 W. Franklin St.<br>Chapel Hill, NC 27514<br>(919) 967-0861 |
| CIRCLE **412** ON READER SERVICE CARD | |
| **Personal Accountant**<br>C64: $34.95; Macintosh: $89.95 | Softsync, Inc.<br>162 Madison Ave.<br>New York, NY 10016<br>(212) 685-2080 |
| CIRCLE **413** ON READER SERVICE CARD | |
| **Checks & Balances**<br>IBM PC, CP/M 2.2 CP/M 80 (64K): $74.95 | CDE Software<br>2463 McCready Ave.<br>Los Angeles, CA 90039<br>(213) 661-2031 |
| CIRCLE **414** ON READER SERVICE CARD | |
| **Managing Your Money**<br>IBM PC, Compaq: $199.95 | MECA<br>285 Riverside Ave.<br>Westport, CT 06880<br>(800) 631-MECA<br>(203) 222-9087 |
| CIRCLE **415** ON READER SERVICE CARD | |
| **Your Personal Net Worth**<br>Apple II, C64, Atari: $79.95 IBM PC: $99.95 | Scarborough Systems<br>55 S. Broadway<br>Tarrytown, NY 10591<br>(914) 332-4545 |
| CIRCLE **416** ON READER SERVICE CARD | |

# TSUKUBA EXPO '85 JAPAN

## The tools with which to dream

**John J. Anderson**

I was eight years old in 1964—this is germaine to the topic at hand. At such a highly malleable stage in my mental development, I happened to live on 208th Street, in Queens Village, NY. While in itself this may not seem significant, it was as pivotal to my development as the fact that Hawthorne hailed from Salem, or that Attila eventually discovered himself to be a Hun. For we were a stone's throw from the magnum opus of New York's master builder and only bona fide Pharoah, the venerable Robert Moses. I speak of the New York World's Fair, 1964-1965.

During those two years of my early youth, I must have visited the Fair a hundred times. I was there in weather freezing and sweltering, wet and dry, in darkness and in light. The way other kids would ask to go to the movies, I would say "let's go to the Fair." I would fantasize about moving in permanently, balancing the pros and cons of living in the African Treehouse as opposed to the Coca-Cola Pavilion. I got to know the place as if it were my own neighborhood —the pavilions were my friends. I knew my way around every street and snack bar. The place belonged to me and molded me. I am a product of the Fair.

Ergo I am not what you might reasonably call a World's Fair Buff. I am what you might reasonably call a World's Fair Maniac.

My parents were understanding, and for good reason: they had spent a couple of their own formative years traipsing over the same turf—only at that time Moses had been compelled to call it the New York World's Fair, 1939-1940. And so without much trouble I convinced them to take me to Expo '67 in Montreal, and again in '68 when it was called "Man and His World."

My hopes were dashed, however, in 1970 when I finally came to grips with the fact that we would not make it to Osaka, Japan for Expo '70. I was never quite the same. So for me, the chance to visit Expo '85 was not an assignment, but a sublime opportunity: not only a chance for a first visit to Japan, but to attend a World's Fair there. In other words, a double scoop in seventh heaven.

Why, one might ask, should World's Fairs set me so aquiver with excitement? Why does the mere mention of a Fair throw a strange look into my eyes? Certainly anyone who attended last year's disappointment in New Orleans may fairly ask that question.

### Fair Game

But the answer is simple, really. World's Fairs, when they are done correctly, are places to gain a vision of the future. They are places that pay homage to the past and homage to change itself. They offer a moment's respite from the selfish, individual short-term view, replacing it with a broader perspective—and an optimistic, collective one—concerning the fate of humankind.

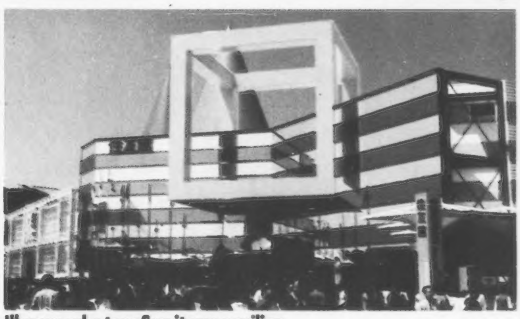
Since the Philadelphia Centennial Exposition of 1876, Fairs have inexorably tied man's future to his technology, and quite rightly so. For it is man's technology that has always determined his future. Fairs reflect the thinking, and machinery, of their times. In Philadelphia 100 years after the birth of our country, Alexander Graham Bell's telephone was on display. Those who used it there spoke and heard the future. At the Paris Exposition of 1889, a 100 horsepower internal combustion engine chugged away. Its noxious exhaust imparted the essence of the future. In New York, 1939, television programs were broadcast for the first time, with a ghostly, flickering image lighting the way to the future on the retinas of its viewers. And at Tsukuba, 1985, 35 miles northeast of Tokyo, robots have come into their glory. They walk, talk, climb stairs, spin tops, draw pictures, lift 500 lb. barbells, march in formation, even build scale models of themselves. And those who meet them at Tsukuba are among the very first to realize that they too are good—if exploited correctly.

People who are afraid of the future, or who simply do not care, will never understand, and Fairs cannot really speak to them. They are, perhaps, too grown-up. For there is another secret about Fairs, and that is they speak most directly to the child in all of us. This is not the same as saying that they are only for children. It is to say that the best appeal of a World's Fair is an appeal both visceral and ostensive. Don't tell us about evolution. Show it to us on a moving belt. Don't explain atomic theory. Give us an atom's eye view through 3-D glasses. World's Fairs at their best give

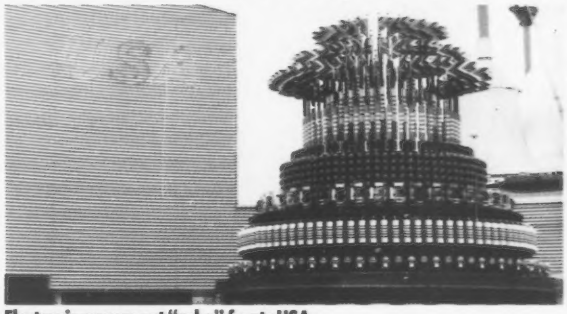
Large satellite dish at the entrance of NEC's pavilion. The front pages of several daily newspapers—received via satellite—were produced on site.

Matsushita robot focuses on a child's head and sketches a portrait in a matter of minutes.

Toshiba robots balance spinning tops on swords and lengths of string.



Illusory cube tops Sumitomo pavilion.



Electronic component "cake" fronts USA.

aid and comfort to the Rationalist within us. And give us the tools with which to dream of the best future we can create, if we would only choose to do so.

## The Inscrutability Syndrome

Unfortunately, most American press coverage has entirely missed the point of the Tsukuba Fair. That in itself is not so surprising, as it seems the American press has misunderstood Japan entirely since December 7, 1941. Compounding the problem are our current trade differences, which have made Japan-bashing into a national sport here. As a result, the Tsukuba Fair has been largely ignored in this country. When it does get some press, it seems to be bad press.

It is a shame. Because the Tsukuba Expo, which has been berated from *Advertising Age* to the *New York Times*, is an exciting and impressive place to visit. It is architecturally striking, while avoiding that most insidious pitfall of World's Fairs, kitsch. It is superbly designed and runs as a clean machine in and of itself. Philosophically its message is clear and forthright: science and technology must be used to create an affluent global community. By embodying the hopes of the 21st Century and presenting a positive view of that future to the very children to whom that future will belong, the makers of the Tsukuba fair are attempting to mold that future to humanistic aims.

## Dreams or Pipedreams?

One way or another, technology is bound to end human suffering—that is undeniable. The question is whether this will be effected by obliterating the causes of the suffering or by obliterating the human species entirely. Expo '85 acts as an emphatic endorsement of the former contingency, while warning that failure will mean the latter.

Some Americans miss the point of the Fair because they are embarrassed about optimism; they think it is naive. But the fact is that optimistic futurism is the only futurism that is worthwhile to pursue. It is only through calm and confident appraisal of our options that we can plan our future at all. Otherwise we might as well hide our heads and let it all happen to us. Arguably this was the philosophy of the New Orleans Fair, which in its party mood made no attempt to show us the right future path. In failing that responsibility, the Fair itself failed. There is a difference between a Fair and a mere festival.

## Still at War?

Seen in an historical context, however, Fairs do reflect more than the mere aspirations and machinations of their times. They also reflect the unintended and sometimes ironic realities by which they are surrounded. The 1939 Fair, for example, poised the ideals of global peace and brotherhood on the knife's edge of approaching holocaust and world war. Some countries represented by pavilions at that Fair ceased to be countries while the Fair itself was in progress. While the 1965 Fair showed another peaceful and unified future, President Lyndon Johnson was redoubling our military commitment in Viet Nam. The unrest of the late '60s was in foment. And the shame of losing that awful war, the disgrace of Watergate, the panic of oil embargo, were unseeable, yet looming in a fearful future the Fair failed to predict.

There are unintended associations also to be found at Expo '85. Today we term our trade deficit differences with Japan as "serious." Exactly 40 years ago, it was Iwo Jima we termed serious. Nearly 30,000 men died to assert a claim upon that tiny island, where the fighting was as fierce as it has ever been among human beings. Now we are friends with the Japanese and have returned Iwo Jima to them in peace and harmony. And it is hard to think of any good reason why we ever should have fought each other.

Yet, there is a remnant of xenophobia and of enmity from the last world war that, deny it as vehemently as we like, secretly pervades our relationship with Japan today. The battlefield now is business, and on some fronts we are on the retreat. It makes those of us who have done the retreating angry and suspicious; make no mistake about it. The subtext of Expo '85 is not to be lost upon Western eyes—one might phrase it "The Future Will Be Made in Japan." And the Japanese are right. We can choose to respond to that challenge or watch ourselves be surpassed.

The fact is that we have continually underestimated the Japanese. They have unwittingly encouraged us in their wholesale adoption of our ways—even in the adoption of World's Fairs.

If only we would realize how much we could stand to adopt from the Japanese concerning patience, pride, teamwork, commitment to goals, and devotion to quality.

### Choose Life

One may well wonder what inglorious precipice we stand before as we predict our glorious future from the fairgrounds at Tsukuba. It is without doubt in the worst case a nuclear threshold to be crossed. Remarkably, it is upon that very account that Japan is our best ally in the world today, as we count down the remainder of the 20th Century and prepare to embark on the 21st. We pray to watch a candle burning down, but fear it is a fuse.

It is Japan, better than any other country, that realizes the obsolescence of war as an apologible human endeavor. For gaining the distinction of being the first country against which nuclear weapons were used, that realization is their honor. A reasoning United States should be a close second in this life-and-death race toward enlightment, as it has the distinction of being the first country to have used the weapon in anger. Tsukuba asks the world that the instances of Hiroshima and Nagasaki also be the last.

Here in pictures we try to show you a bit of Tsukuba Expo '85. If we had another 20 pages to devote to it, we might be able to impart a real feeling of what the place is like. As they have done countless times before with other western concepts, the Japanese have embodied the idea of the World's Fair and outdone us at it. Tsukuba works, wrapping idealism in a wrapper of fun and serving it up with style. ■

# Expo '85: International, but Oh, so Japanese

## Getting there is half the fun/**David H. Ahl**

Although Tsukuba Expo '85 is featured in virtually every in-flight and travel magazine, as well as on flyers, billboards, and kiosks all over Tokyo, beyond mentioning the dates (March 17 to September 16, 1985) and location (Tsukuba Science City), there is no real information on how to get there. Just how much of a barrier this is was proved to us when we went to Tokyo central railroad station to buy tickets. The minute we said "Tsukuba" (or anything else, for that matter) the ticket clerks' faces went blank. Finally, we were directed to Window 14.

After much gesturing, drawing, and referring to our phrase book, each of us wound up with two round trip tickets for the train and connecting bus to Tsukuba. We were on our own to figure out that the train did not leave from Tokyo, but rather from Ueno, an outlying station—although our tickets could be used to get us there from Tokyo. We entertained a few uncharitable thoughts about Japanese inhospitality toward English-speaking visitors until we considered the hapless Japanese who arrived at Kennedy last summer, took a Carey limo into Manhattan, and inquired at Penn Station for tickets to Expo '84. How many of the barely literate clerks there would even have heard of Expo much less have known it was in New Orleans? And if the inquiry came in phrase book English from a Japanese . . .

When, the next day, after a crowded but relatively uneventful 90-minute journey we arrived at the Expo site, we considered ourselves fortunate indeed.

### Not Cheap

Think things are cheap in Japan? Think again. A Japanese family of four living in Tokyo and planning to visit Expo for three days would have to budget at least $350 assuming they brought (or bought) box lunches. Adding hotel, meal, and transportation expenses for those living further away would bring the tab to well over $1000—hardly a bargain.

Meals at some Expo pavilions were outrageously expensive (a modest lunch in the Swiss Pavilion cost more than $12 per person). Yet Expo restaurant owners were complaining bitterly that vendors outside of the Expo grounds were selling box lunches for the equivalent of only $3 or $4 and that some tour operators were furnishing their customers with these box lunches. "Unfair," they said. "Healthy competition," we thought.

### Patient but Pushy

The weather on the three days we attended Expo ranged from warm and

Fair features world's largest television, Sony Jumbotron (left), here capturing images of editors Staples, Anderson, and Ahl; also world's largest Ferris wheel (right). In a 70mm film at the Toshiba pavilion, a friendly bilingual robot showed a boy several dramatic computer simulations.

Robot developed by Waseda University reads music and plays the organ.

sunny to soggy and rainy. Nevertheless, the crowds were always large and enthusiastic. Popular pavilions like Fujitsu and Toshiba drew lines an hour or more in length. In sharp contrast to crowds waiting at similar American events, the Japanese were patient and orderly—almost stoic—as they waited. But once inside the door, a transformation occurred—push, shove, trample, let nothing stand in the way of a front center seat. Nevertheless, we were in awe of the excellent people handling on the part of most pavilion personnel and the polite patience of the Japanese as they waited to see each exhibit in turn.

In general, we felt that the average Expo visitor was better dressed and better behaved than those we have seen in other countries. Furthermore, the Expo grounds were spotlessly clean, and the quality of construction of the buildings and exhibits—which are to be torn down in six months—was as high as many permanent buildings in the U.S.

## An Overall Theme

The aim of Expo '85 was to make science and technology accessible to the masses, especially children—and in meeting that goal it succeeded admirably. While we saw perhaps too many animal mating rituals, too many 3-D movies, and too many laser light shows, the overall quality was outstanding. Media critics in the U.S. were quick to condemn Expo exhibitors for not providing enough detail about new technologies, but that was not the purpose. As a TDK manager told us, the objective was to attract young people to the sciences, and few exhibits could be faulted for not contributing to that goal.

One that we faulted was the U.S. exhibit with its theme of "Artificial Intelligence: Amplifying the Mind." The flagship display was a 15-monitor exhibit intended to be a representation of an artificial intelligence computer called the Mind Machine. The program on the machine involves a Japanese-American going on a date in a 1957 Chevy. Enroute to meeting his girl the car breaks down. The simulated expert system in the Mind Machine helps the fellow diagnose the problem and get back on the road. Another expert system on a Symbolics computer was programmed to draw "humanoid" shapes knowing only that a body has four limbs, the head is on top of the body and it contains two eyes and a mouth. Most people, having earlier seen the Matsushita robot drawing excellent portraits, were not impressed.

## The Best and the Worst

Best scientific explanation: to Fujitsu for its computer-produced 3-D film projected on a huge dome explaining the formation of atoms into molecules into crystal structures into the DNA chain. Fantastic!

Best historic explanation: to IBM Japan for its entirely visual explanation (no narration) of the development of thought and logic from primitive man to present day computers.

Best academic exhibit: to Waseda University for its four robots which walked, talked, performed surgery (simulated), and played the organ.

Best participative exhibit: to NEC for its space journey in which every participant had access to a touch-sensitive TV screen, the cumulative input of which determined the direction and control of the simulated spaceship.

Best overall multi-media show: to Toshiba for a 70mm film featuring a multi-lingual robot showing a youngster how computers can simulate real world events. Other live robots in the pavilion demonstrated various aspects of intelligent robotics.

Best propaganda: to the Russian exhibit which showed consumer products produced in the Soviet Union.

Worst propaganda: to the Iranian exhibit which purported to show advances in human rights and ecology—including "batonology."

Worst execution of a concept: to the U.S. pavilion which attempted to impart an understanding of artifical intelligence in three easy lessons.

Worst special effects for the sake of special effects: to Mitsui for its film shown on a wall of falling water, demonstrating nothing more than that a film can be shown on a wall of falling water.

Best VIP visitor facility: NEC.

Best restrooms: Hitachi.

Best food value: McDonalds.

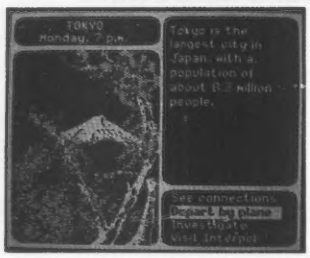
Best souvenirs: the ceramic scissors of Kyocera.

Overall, we felt Japan and its 27 participating manufacturers were to be complemented on producing one of the best, if not the best, scientific Expo of the century. They are expecting 20 million visitors before it closes; after the first month, 3 million people had entered the gates. Why not join them if you can? ■

# SOFTWARE DIGEST

## A discriminating selection of current releases

### Where in the World is Carmen Sandiego?




GRAPHICS (+)
PLAYABILITY (+)
CHALLENGE (+)
ADDICTIVENESS (+)
EASE OF LEARNING (+)

**System and Price:** 64K Apple II, $39.95

**Summary:** Delightful mystery and international chase with an almanac aid

**Manufacturer:**
Broderbund Software
17 Paul Dr.
San Rafael, CA 94903
(415) 479-1170

CIRCLE **434** ON READER SERVICE CARD

In this intriguing game your mission is to track and apprehend one of ten thieves who has stolen a well known landmark. Your starting point is the scene of the crime. On the screen is displayed your present location, the day, and the time. As you travel from city to city, you can investigate any (or all) of three locations in the city such as a museum, library, hotel, market, or airport. At each location you may pick up a clue to the identity of the criminal or where he is headed.

The clues that you pick up must be interpreted—and therein lies the real fun (and challenge) of the game. For example, the bank manager may tell you that a person with red hair just changed currency into forints. It is up to you to determine that forints are the currency of Hungary and the next destination of the thief is Budapest. Lucky for you, Broderbund has packaged a copy of *The World Almanac and Book of Facts* with the game.

Also at your disposal is the Interpol Crime Computer with which you can narrow down your list of suspects. When you have pinned down the identity, Interpol will issue an arrest warrant. Now you are ready to make an arrest as soon as you catch up with the suspect.

This exceptionally well-designed game combines the elements of graphic adventures, trivia games, mysteries, with even a bit of arcade animation thrown in. With ten suspects, 30 cities, and nearly 1000 clues, you're sure to get a different game every time you play. Highly recommended for both youngsters and adults.—*DHA*

### F-15 Strike Eagle

GRAPHICS (+)
PLAYABILITY (+)
CHALLENGE (+)
ADDICTIVENESS (+)
EASE OF LEARNING (+)

**System and Price:** Apple, Atari, C64, IBM PC/PCjr, $34.95

**Summary:** Fantastic F-15 flight/fight simulator

**Manufacturer:**
MicroProse Software
120 Lakefront Dr.
Hunt Valley, MD
21030
(301) 667-1151

CIRCLE **435** ON READER SERVICE CARD

The F-15: a single-seat, all-weather, air superiority and ground attack fighter. The U.S. Air Force bases them all over the world, from West Germany to Okinawa. And with *F-15 Strike Eagle* from MicroProse, you can park one inside your computer.

Park? Did I say park? The real F-15 climbs 50,000 feet per minute, flies at Mach 2.5 (about 1750 miles per hour), and carries a 20mm cannon, MK-82 bombs, and Sidewinder and Sparrow missiles. The microcomputer version duplicates these specifications and sends you soaring over Libya, Iran, Syria, Vietnam, and other hostile places.

The action reaches out and pulls you into the simulation. The earth swirls beneath your wings as you engage in high-speed dogfights with Soviet-made interceptors. SAM missiles track you relentlessly until you activate electronic countermeasures. Targeting sights appear on the heads-up display. Fuel threatens to run out as you try to make it back to base.

The graphics could use some improvement but are satisfactory given the sophistication of the simulation and the limitations of a microcomputer. The enemy aircraft are really modified triangles, and the primary target is a flat triangle. However, the smooth scrolling and rolling action more than make up for rudimentary aircraft silhouettes.

The 36-page manual tells you how to operate the F-15 (at least the microcomputer version), includes aircraft specifications, and offers tips on flying maneuvers. The latter are interesting, if a bit difficult for a rank novice to reproduce on the screen. I never quite managed to "reduce your bank angle, pull up into a steep dive, roll inverted over the top of a half loop . . ."

Although somewhat unrealistic in some aspects—"lone wolf" attacks went out with World War I and not too many F-15s were around in Vietnam—the overall effect is a fantastic flight simulator. If you want to experience air-to-air combat without putting your hide on the line, pick up *F-15 Strike Eagle*. We recommend it highly.—*RSL*

## College Decision

PERFORMANCE (-) (+)

EASE OF USE (-) (+)

FLEXIBILITY (-) (+)

COMPREHENSIVENESS (-) (+)

SUPPORT (-) (+)

**System and Price:** Apple II, $39.95

**Summary:** May introduce you to some new colleges

**Manufacturer:** Educational Planning, Inc. P.O. Box 79606 Houston, TX 77279

CIRCLE **436** ON READER SERVICE CARD

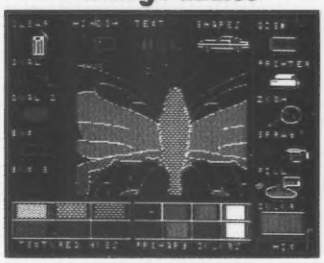
*College Decision* by Educational Planning, Inc. is a college selection aid aimed at home users. More modest in conception (and price) than *College Explorer* from The College Board (reviewed April 1985), *College Decision* will, nevertheless, provide valuable information to the college-bound student.

The program asks you to make a choice in three or four of seven descriptive categories. For example, in composition of student body, you may choose male, female, co-ed, or no preference. The categories are: geographic region of the U.S., location (size city or town), undergraduate size, composition of student body, tuition and fees, academic rating, and sororities and fraternities. After you make each choice, a number in the upper right of the screen indicates the number of colleges left that satisfy all of your criteria.

After making all your choices, the program will print or display a list of colleges that satisfy your criteria. Each college is described with the above seven factors, average SAT scores of the freshman class, male/female ratio, strong academic areas, and other features of interest (work/study programs, religious background, etc.).

In our test, the program was easy to use and worked well. However, we didn't like the fact that you must make a single choice from each category instead of a range. For example, in size, you must choose Under 2000, 2-5000, 5-10,000, 10-15,000, or 15,000 plus. We would have liked to be able to choose under 2000 plus 2-5000, but to do that you must make a second run. The other major limitation is the size of the database: 303 colleges (compared to 3414 on the *College Explorer* package). On the other hand, the cost is just $39.95 against $189, so you get what you pay for.—*DHA*

## Blazing Paddles



PERFORMANCE (-) (+)

EASE OF USE (-) (+)

DOCUMENTATION (-) (+)

UTILITY (-) (+)

OVERALL VALUE (-) (+)

**System and Price:** Apple II, $49.95; C64, $34.95

**Summary:** Commendable drawing program

**Manufacturer:** Baudville 1001 Medical Park Dr. Grand Rapids, MI 49506 (616) 957-3036

CIRCLE **437** ON READER SERVICE CARD

*Blazing Paddles* is an effort to create a color *MacPaint*-like drawing program for the Apple II and Commodore 64. For the most part, the program lives up to its name—easy-to-use and very fast.

A "main menu" of icons surrounds the screen, leaving a central window into your drawing. When you choose one icon, all disappear and your drawing fills the screen. The function triggered by the icon remains in effect until you go back to the main menu and choose another.

The program reproduces many of the *MacPaint* functions, including outline and filled boxes and ovals, automatic straight lines, contiguous lines, different brush sizes, spraypaint, dots, "fat bits" zoom, undo, paste, and a variety of sizes and fonts for text. The difference is in the color. You can choose up to 200 "textured hues" and work them into your drawing. All functions perform admirably. Input devices include a mouse, joystick, graphics tablet, and light pen.

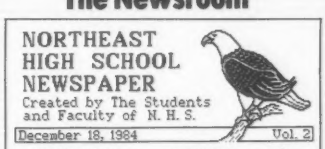
The big disappointment is the alleged "cut and paste" function. You cannot "cut" a portion of the drawing. You can replicate a portion all over the screen, but to cut it, you must go back to the main menu and paste the background color over the unwanted portion. Baudville programmer David Walker notes that when this last feature was added to the program, no room was left for full-cut capabilities. The result is that putting things on screen is a lot easier than taking them off.

The zoom function, which lets you draw with individual pixels, becomes ornery when you try to place certain color combinations together. This quirk of the 6502 hardware can make life miserable for pixel perfectionists.

Drawings are saved to disk and may be recalled at any time and patched into different pictures. Over a dozen printers are supported, including some color printers.

Overall, *Blazing Paddles* does a commendable job of bringing *MacPaint* to the Apple II and C64. It is fast, easy-to-use, and a lot of fun.—*RSL*

## The Newsroom


NORTHEAST HIGH SCHOOL NEWSPAPER

Created by The Students and Faculty of N. H. S.

December 18, 1984 Vol. 2

BULLDOGS TAKE A BITE OUT OF BAYVIEW

NOT EVERY ONE LIKES LEMON MERINGUE PIE

STOP THIEF— WHOEVER YOU ARE

PERFORMANCE (-) (+)

EASE OF USE (-) (+)

DOCUMENTATION (-) (+)

UTILITY (-) (+)

OVERALL VALUE (-) (+)

**System:** Apple II, IBM PC, PCjr, C64; $49.95

**Summary:** Handy for informal publications

**Manufacturer:** Springboard Software, Inc. 7807 Creekridge Cir. Minneapolis, MN 55435 (612) 944-3912 (800) 328-1223

CIRCLE **438** ON READER SERVICE CARD

Combining word processing with an extensive library of clip art, *The Newsroom* is a pagination system for creating fledgling newspaper pages in a series of panels that are combined into standard or legal-sized editions during printout.

Writing, editing, art reproduction, and layout take place on a menu-driven

screen, and a "wire service" feature allows stories to be transmitted by modem-equipped computers. Built into the software is the ability to send and receive text from usually incompatible systems such as IBM PC, PCjr, Apple II, and C64 computers.

Art and text can be moved around the page to create the layout, with text automatically wrapping around the art whenever desired.

A separate program disk holds more than 600 cartoon-style drawings. However, the graphics stored on disk are pre-sized—some small, some large; thus, the versatility is somewhat limited.

The major drawbacks to this otherwise well-conceived program are its bland, unresponsive menu and the absence of examples. Before the first page can roll off the printer, you must enter the text, create the banner, write the heads, transfer the art, and solve the layout scheme. A sample page on-screen would be a big help to first-time users.

Although Springboard stresses the potential of *The Newsroom* as an educa-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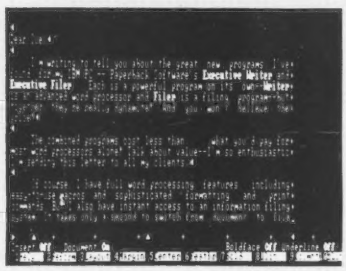
## Executive Writer



Adam Osborne, rising from the ashes of Osborne Computer brings us Paperback Software. His objective in the new venture: offer utilitarian products at a low price.

*Executive Writer* is designed to work like a Wang dedicated word processor, complete with non-printing informational symbols. It includes all of the standard editing and formatting features, as well as several advanced features such as file merging, macro keys, indexing, footnoting, and even insertion of graphics into the text. Should any problems arise, excellent on-screen help is available at the press of a function key.

Complete cursor control includes moving the cursor by word, line, and screen, and to the top and bottom of the file. An especially nifty feature is the ability to specify a certain number of lines to go forward or backward.

On monochrome and color monitors, text is displayed at half-intensity. When you trigger the boldface function, your text appears at normal intensity—in effect giving the appearance of boldface right on the screen. Underlining is a different story. On the monochrome monitor, you actually see the underline on the screen. However, on a color monitor, underlined text is a different color and underlined, boldfaced text is a third colon.

So far, *Executive Writer* is an excellent word processing program. However, it does have some limitations that detract from its effectiveness.

The most irritating one is not knowing where you are in a document. The

tional tool through high school, its level of sophistication may be better suited for upper elementary to junior high school students. Clubs, churches, and some businesses also will find *The Newsroom* useful for publishing simple newsletters, bulletins, and advertisements.—*CAC*

| | |
|---|---|
| PERFORMANCE | (+) |
| EASE OF USE | (+) |
| DOCUMENTATION | (+) |
| UTILITY | (+) |
| OVERALL VALUE | (+) |

**System and Price:** 128K IBM PC and compatibles, $69.95

**Summary:** Impressive, with some limitations

**Manufacturer:** Paperback Software 2612 8th St. Berkeley, CA 94710 (415) 644-8249

CIRCLE **442** ON READER SERVICE CARD

program displays neither page nor line number, and you never know where the page breaks fall.

The second irritating idiosyncrasy is the lack of automatic reformatting while in insertion mode or after moving a block of text. While inserting text, you can type past the right margin and scroll into the next screen. The program does have a special "open insert" mode that clears the screen and performs word-wrap functions, but for all those small one- and two-word insertions as well as block moves, you are stuck pressing a function key.

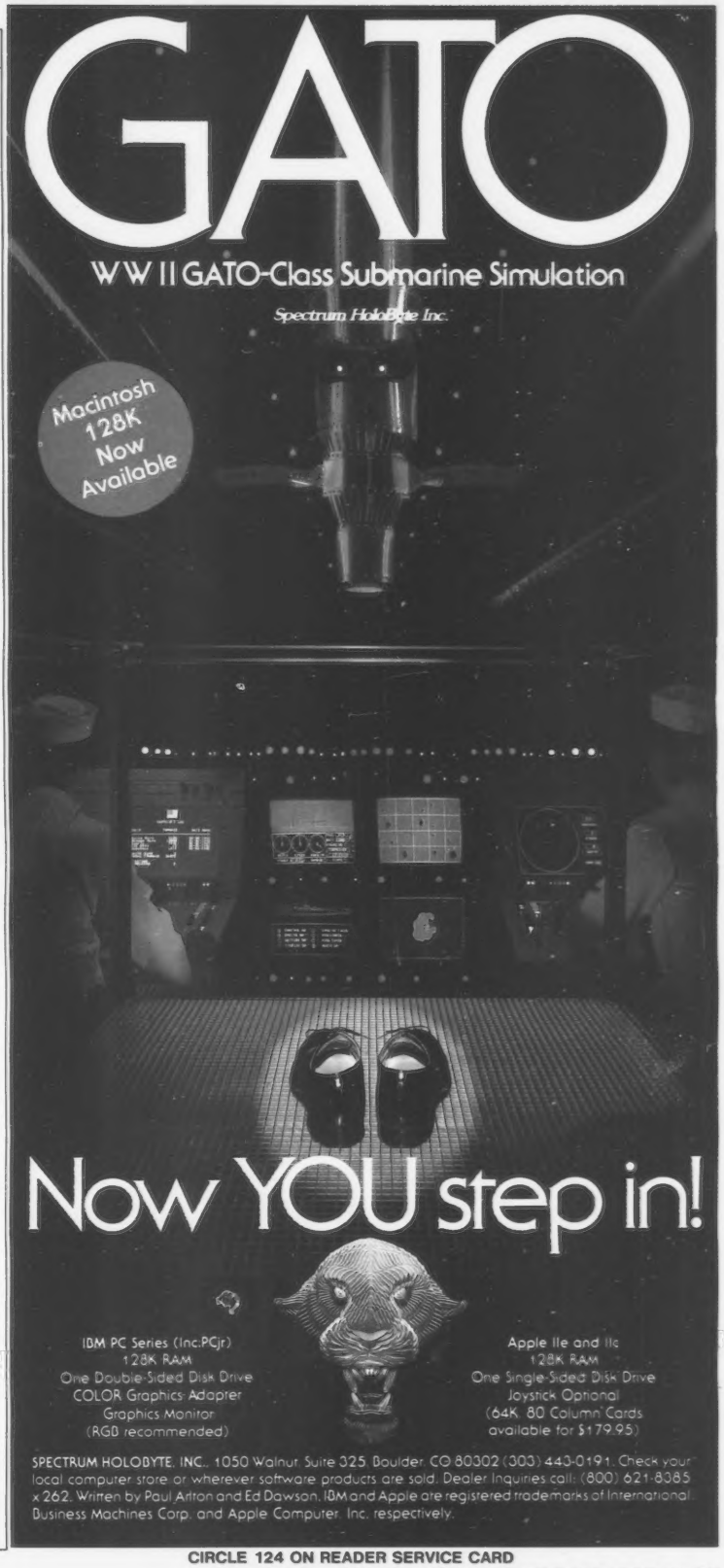
The documentation, while generally good, could feature information about the logged disk drive more prominently.

Hard disk owners will find that *Executive Writer* does not recognize DOS 2.0 pathnames directly. The manual provides instructions on using the program with subdirectories.

You can print to screen, to disk, or to a printer. Roughly a dozen printer drivers, including a configure-your-own, are available.

Customer support for all Paperback products costs $5 for the first five minutes and $1 per minute thereafter, plus long distance telephone charges. Replacement disks are $5.

All in all, *Executive Writer* proves to be an outstanding word processor with many of the capabilities found in full-featured programs costing hundreds of dollars more. We give it high marks, and if you can work around the idiosyncrasies, the price will surely make you smile. —*RSL*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CIRCLE 124 ON READER SERVICE CARD

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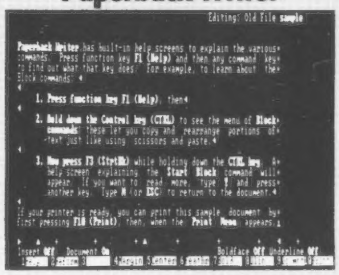
## Paperback Writer



PERFORMANCE

EASE OF USE

DOCUMENTATION

UTILITY

OVERALL VALUE

**System and Price:** 128K IBM PC, $39.95

**Summary:** Cheap, no-frills word processor

**Manufacturer:**
Paperback Software
2612 8th St.
Berkeley, CA 94710
(415) 644-8249

CIRCLE **440** ON READER SERVICE CARD

*Paperback Writer*, a streamlined version of *Executive Writer*, gives you basic word processing features and functions at a bargain basement price.

The program offers standard editing functions like insert, delete, search and replace, and block operations. Formatting functions include margins, justification, tabs, centering, line spacing, boldfacing, and underlining. All features and functions are controlled and invoked with a combination of function, shift, control, and alternate keys. Excellent on-screen help is also available.

You invoke the printing function with a function key. Since *Paperback Writer* does not use advanced functions such as super- or subscripting or graphics, it also does not use specific printer drivers. In fact, the program does not even have a printer installation procedure. Thus, the program should work with most printers.

Note that *Paperback Writer* exhibits the same bad habits as its big brother *Executive Writer*. You still never know where you are on a page, have no automatic reformatting while in insert mode or after a block move, need to perform a crude patch job to work with hard disk subdirectories, and never quite understand file size.

The documentation possesses the same overall clarity as the manual for *Executive Writer*. However, it is skinnier because information covering the advanced features of *Executive Writer* has been excluded. Customer support is billed at the same rates as *Executive Writer*.

*Paperback Writer* offers a no-frills word processor at an attractive price. It is best used for very simple word processing jobs, such as memos and short letters. However, sooner or later, you will probably outgrow it. Given the small price differential between the basic *Paperback Writer* and the more advanced *Executive Writer*, our recommendation is to pass up *Paperback* in favor of *Executive*.—*RSL*

## Executive Filer

*Executive Filer*, a filing program from Paperback Software, boasts a multitude of features and an easy-to-use format that will have you cataloging information minutes after removing the disk from its packing.

Unlike a database management system, which forces you to define specific fields of information, filing programs allow you to place information anywhere on an electronic equivalent of a 3"x5" card. This "card" is then named with several keywords. The tradeoff for this ease of use is overall power, accuracy, and versatility. However, for all but the most demanding professional use, filing programs are more than enough to catalog collections, assemble references, and maintain address files.

*Executive Filer* uses the card-drawer-cabinet motif so popular in filing systems. Several cards make up a drawer and several drawers make up a cabinet. Finding information consists of opening a cabinet, pulling out a drawer, and sorting through the cards using specific keywords, up to 10 of which can be assigned per card. Note that while hundreds of keywords are allowed, their number is nonetheless finite. The menu-driven procedure is fast and leaves little room for confusion.

PERFORMANCE

EASE OF USE

DOCUMENTATION

UTILITY

OVERALL VALUE

**System and Price:** 192K IBM PC and compatibles, $69.95

**Summary:** Outstanding card filing system

**Manufacturer:**
Paperback Software
2612 8th St.
Berkeley, CA 94710
(415) 644-8249

CIRCLE **441** ON READER SERVICE CARD

Each card holds up to 8000 characters (about 1500 words), and you can stuff up to 64,000 cards into one cabinet—if you do not exhaust disk space first. A cabinet holds up to eight drawers.

Better yet, you can integrate *Executive Filer* into *Executive Writer*. Information is transferred between the two in either direction with a few keystrokes. Pairing the two programs also creates a simple mail merge feature.

*Executive Filer* will store and display graphics (if your IBM PC has a graphics board). Macros, editing of cards, adding and deleting keywords, and logical operators (AND, OR, and NOT) are features you will find in this marvelous program.

The organized and complete documentation complements the on-screen help, so we predict most filers will never need to use Paperback's pay-as-you-call customer service. Replacement disks are $5.

*Executive Filer* is a good, clean, straightforward filing system. While it certainly will not displace *dBase II/III, Rbase: 5000, InfoStar+*, or any other high-powered database management systems, it can hold its own against other electronic card filing systems. And the Adam Osborne price aims to please. —*RSL* ■

# WHAT'S NEW

## The latest in hardware and software/**Russ Lockwood**

### Attack of the IBM PC AT Compatibles

Our July 1985 issue reviewed the Kaypro 286i, the first delivered IBM PC AT compatible. Since then, a host of companies have introduced AT clones.

Compaq has announced the Deskpro 286, a desktop computer based around a 80286 microprocessor operating at either 8MHz or 6MHz. Model 1 features 256K RAM expandable to 8.2Mb, one 1.2Mb floppy disk drive, five expansion slots, parallel port, serial port, and security lock. The base price is $4244. An upgraded model with 512K RAM and a 30Mb hard disk retails for $5999.

Compaq has also announced the Portable 286, a portable version of the Deskpro 286 with a built-in 9" monochrome monitor. The base model costs $4499, and an upgraded model with 640K RAM and 20Mb internal hard disk retails for $6299.

**Compaq**
20555 FM149
Houston, TX 77070
(713) 370-0670

CIRCLE **417** ON READER SERVICE CARD

Zenith has introduced the Z-200, a $5600 AT compatible with 512K RAM, one 1.2Mb floppy disk drive, one 20Mb hard disk drive, and six expansion slots.

**Zenith**
1000 Milwaukee Ave.
Glenview, IL 60025
(312) 391-8949

CIRCLE **418** ON READER SERVICE CARD

Corona Data Systems has announced the AT Transportable, a $4500 transportable IBM PC AT compatible built around a 6MHz 80286 microprocessor. It features 512K RAM, one 1.2Mb floppy drive, one 360K floppy drive, one RS-232 serial port, one parallel port, three AT-compatible expansion slots and two XT-compatible expansion slots, and a built-in 9" monochrome monitor. Another model with a 20Mb hard disk drive sells for $5500.

**Corona**
275 Hillcrest Ave.
Thousand Oaks, CA 91360
(805) 495-5800

CIRCLE **419** ON READER SERVICE CARD

NCR has entered the AT compatible market with its PC8. Based on the 6MHz 80286 microprocessor, the basic model comes with 256K RAM, expansion slots, serial port, parallel port, and one 1.2Mb floppy disk drive and retails for $3795. An enhanced model comes with 512K RAM and a 20Mb hard disk drive and retails for $5505.

**NCR**
Dayton, OH 45479
(513) 445-1381

CIRCLE **420** ON READER SERVICE CARD

Basic Time, a manufacturer of add-on equipment for the IBM PC, has released the BT AT. It comes with 640K RAM, one 1.2Mb floppy disk drive that reads and writes 360K disks, a 44Mb hard disk drive, two serial ports, a parallel port, graphics board, and monochrome monitor and sells for $4495.

**Basic Time**
17129 S. Kingsview Ave.
Carson, CA 90746
(408) 727-0877

CIRCLE **421** ON READER SERVICE CARD

Texas Instruments has introduced the Business Pro, an IBM PC AT compatible built around an 80286 microprocessor. It comes with 512K RAM expandable to 15Mb, 360K or 1.2Mb floppy disk drives, and 21Mb, 40Mb, or 72Mb hard disk drives, and uses either the MS-DOS 3.0 or Xenix operating system. Netware/E-TI local area network hardware and software can connect up to 50 personal computers to the Business Pro.

The base model, with 512K RAM, one 1.2Mb floppy drive, one serial port, one parallel port, keyboard, and system unit sells for $3995. The enhanced model, with 21Mb hard disk drive, sells for $5795. Eight additional configurations are available and range in price from $4400 to $10,785.

**Texas Instruments**
P.O. Box 809063
Dallas, TX 75380
(800) 527-3500

CIRCLE **422** ON READER SERVICE CARD

Televideo has released the Televideo AT, an AT compatible also built around an 8MHz 80286 microprocessor. It includes 512K RAM, one 1.2Mb floppy drive, serial port, parallel port, eight expansion slots, and one 20Mb hard disk drive and retails for $4795.

**Televideo**
550 E. Brokaw Rd.
San Jose, CA 95150
(408) 971-0255

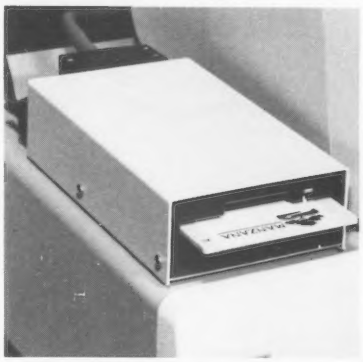
CIRCLE **423** ON READER SERVICE CARD

## 3.5" Disk Drives for IBM PC and Apple II

Manzana has introduced an external 730K, 3.5" disk drive for the IBM PC. It supports all standard DOS 2.0 commands, uses standard 3.5" disks, and connects to the IBM disk control adapter. Files can be transferred between the IBM PC and the Data General One, Texas Instruments Pro-Lite, Hewlett-Packard 150, "and the forthcoming IBM lap-top." The drive costs $625.

**Manzana**
935 Camino Del Sur
Isla Vista, CA 93117
(805) 968-1387

CIRCLE **424** ON READER SERVICE CARD



Tymac Controls has released the MDD-640, a 3.5" Micro Disk Drive for the Apple II, II+, and IIe. The drive stores up to 640K, accesses information 93% faster than the standard Apple 5.25" floppy drive, and is compatible with both DOS 3.3 and ProDOS operating systems. The MDD-640 comes with a controller board, ribbon cable, and utility disk. It retails for $419.

**Tymac Controls**
127 Main St.
Franklin, NJ 07416
(201) 827-4050

CIRCLE **425** ON READER SERVICE CARD

## Turbo Pascal Update

Borland International has released version 3.0 of its popular Turbo Pascal. The new version achieves a two-fold increase in compilation and execution speeds over version 2.0 and adds graphics, binary coded decimal (BCD) support, and a memory-mapped editor. Turbo Pascal version 3.0 retails for $69.95; with either BCD or 8087 support $109.90; and with both BCD and 8087 support $124.95.

**Borland International**
4113 Scotts Valley Dr.
Scotts Valley, CA 95066
(408) 438-8400

CIRCLE **426** ON READER SERVICE CARD

## Sublogic Flight Simulator

Sublogic, the creator of Sublogic *Flight Simulator* and Microsoft *Flight Simulator*, has announced a new version that supports the 640 x 350 pixel Hercules graphics board. The price remains $49.95.

**Sublogic**
713 Edgebrook Dr.
Champaign, IL 61820
(217) 359-8482

CIRCLE **427** ON READER SERVICE CARD

## Roots and Prefixes

Davidson has released *Roots and Prefixes*, a 500-word data disk for its *Word Attack!* vocabulary building program. It includes Greek and Latin prefixes, roots, and words and retails for $19.95.

**Davidson & Associates**
6069 Groveoak Pl. #12
Rancho Palos Verdes, CA 90274
(213) 373-9473

CIRCLE **428** ON READER SERVICE CARD

## Integrated Software

Software Resource Group has introduced *Brown Bag Software*, an integrated word processor and database for the Commodore 64 and Apple II. It includes on-line help, search and replace, mail merge, alphabetical and numerical sorting, and the ability to transfer information from database to word processor. *Brown Bag* retails for $49.95.

**Software Resource Group**
1095 Airport Rd.
Minden, NV 89423
(702) 782-9731

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## Sideways Spreadsheet

Timeworks has added *Sideways*, a program to print spreadsheets sideways on paper, to its *SwiftCalc* spreadsheet program. *SwiftCalc* for the IBM PC retails for $149.95; for the Apple, $99.95; and for the Commodore 64, $49.95.

**Timeworks**
444 Lake Cook Rd.
Deerfield, IL 60015
(312) 948-9200

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## AI for Atari, C64, C128, Apple, and IBM PC

Ultimate Media has announced *Advisor*, an artificial intelligence development system for the Atari 800, Commodore 64, and Apple II. It allows interactive editing, production rule construction, and multiple windows and retails for $99.50.

**Ultimate Media**
275 Magnolia Ave.
Larkspur, CA 94939
(415) 924-3644

CIRCLE **431** ON READER SERVICE CARD

Abacus Software has released *Xper*, an expert system development shell for the Commodore 64 and Commodore 128 computers. It includes full reporting and data maintenance capabilities and retails for $59.95.

**Abacus Software**
2201 Kalamazoo SE
Grand Rapids, MI 49510
(616) 241-5510

CIRCLE **432** ON READER SERVICE CARD

KDS has announced the *Knowledge Delivery System*, an expert system shell for the IBM PC. It allows up to 16,000 rules from up to 4096 case histories and can include up to 512 conditions and 256,000 facts per module. Knowledge modules can be linked, limited by available disk space. It retails for $795.

**KDS**
934 Hunter Rd.
Wilmette, IL 60091
(312) 251-2621

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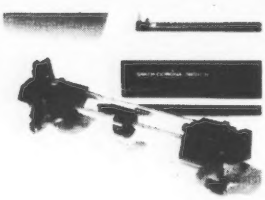

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Size Weight: Height 4" Width 16.5" Depth 9" Weight 8.2 lbs.
Electrical Needs: 120V/60Hz
Internal Char. Coding: ASCII±ISO
Print Buffer Size: 132 Bytes (1 line)
No. of Char. in Char. Set: 96 ASCII± International
Graphics Capability: Standard 60, 72 Dots Per Inch Horizontal, 72 Dots Per Inch Vertical
Pitch: 10, 12, 16.7, 5, 6, 8.3
Printing Method: Impact Dot Matrix
Char. Matrix Size: (Standard) 9H x 8V, (Elongate) 10H x 8V
Printing Features: Bi-directional, Short line seeking
Printing Speed: 80 CPS

### PAPER

Type: Plain
Forms Type: Fanfold, Cut Sheet
Max Paper Width: 11"
Feeding Method: Friction Feed Std.; Tractor Feed Included

### RIBBON

Type: Cassette — Fabric inked ribbon
Life: 1 million characters

### CHARACTER MODE

Character Font: 9 x 8 Standard, 10 x 8 Elongated, No. 8 pin to be used for underline
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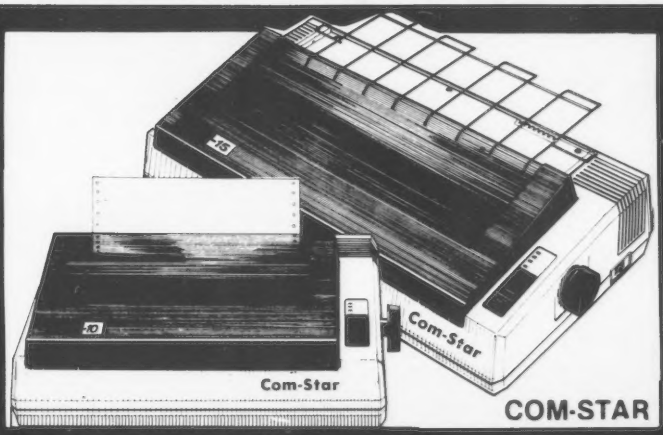


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Has all the features of the 10X COM-STAR PRINTER plus 15½" carriage and more powerful electronics components to handle large ledger business forms! (Better than Epson FX 100 & Delta 15).
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# THE COMPUTER SCIENTIST

## Personal computers for the disabled

**Forrest M. Mims, III**

There are many people for whom personal computers can offer a genuine improvement in the quality of life. I have in mind those who have lost or who never had the use of one or more senses or limbs. This column discusses some of the ways computers can assist such people. It also presents two sample programs that enable a profoundly handicapped person to use a computer merely by puffing into a tube or by touching a switch.

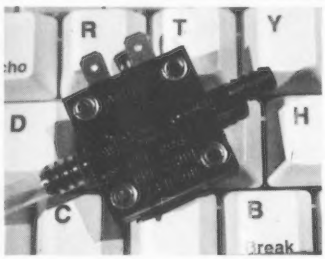
Most of you readers are not physically disabled. Nevertheless, I hope you will read this article. You might pick up a few programming tips and ideas that can be applied in other areas. Or you might have a disabled friend or relative who can benefit from the ideas presented here. In any event, I hope you will come away with a new appreciation for the incredibly versatile machine that is the personal computer.

### The Input Barrier

The keyboard of the MS-DOS computer into which this text was typed has 90 keys. Most of these keys have two functions, the second being implemented when a SHIFT or CONTROL key is pressed. Though this keyboard is beautifully designed and a delight to use, it is an impenetrable barrier between the computer and a disabled person who cannot use his hands.

The same can be said of other kinds of input devices. Graphics tablets, mice, light pens, touch screens, and virtually all other popular means of controlling a computer require a fair degree of manual dexterity.

In 1972, several years before the arrival of the personal computer, Rick Foulds, an engineer at Tufts University, invented a communication device for severely handicapped people. Fould's device, which was called the Tufts Interactive Communicator (TIC), permitted users to compose messages on an LED display. Instead of a traditional keyboard, a single on-off switch was used to enter messages. Virtually any kind of switch could be used. For example, a pressure-sensitive "puff-sip" switch would allow a user to compose messages simply by puffing into a plastic tube. Or the same result could be had by closing a leaf switch with the tongue, chin, or any part of the body that could be moved by the user.




**One of the most interesting switches is a pressure activated puff-sip switch like the Fairchild Model PSF 100A Pressure Sensor.**

The key to Fould's communicator was a self-scanned array of characters. The alphabet was divided into clusters of five characters, and each cluster was then momentarily selected by an LED indicator. If a desired character was in the selected cluster, the user actuated the switch. The individual characters within the cluster were then scanned one by one until the user selected the target character by a second closure of the switch. In this fashion, words could be assembled on the display of the TIC.

Using the TIC and similar devices that employ row-column scanning is both tedious and time consuming. A speech recognition system that enables a disabled person to control a computer or other device simply by speaking offers a much faster approach. However, some disabled people either cannot speak or slur their words so badly that consistently reliable machine speech recognition isn't possible.

Another alternative is an eyeglass-mounted optical system that detects the point on a screen at which a user is staring. This approach is much faster than row-column scanning, because the human eye does the scanning. It has not, however, been perfected, and it is expensive.

### Accessing Personal Computers

The principle behind Rick Fould's Tufts Interactive Communicator can be easily used to make ordinary personal computers at least partially accessible to the severely disabled. I have experimented with various ways to replace the keyboard of such machines with either a single switch or a switch and a variable resistor. Before describing two of the experimental programs I have designed, let's discuss some of the switches and variable resistors that are suitable for use as keyboard replacements.

A person who can move a finger or toe can operate an ordinary pushbutton or spring-return toggle switch. Of course, the switch must be firmly mounted in an accessible location. Switches having a lever activator can sometimes be used by those who cannot operate a pushbutton or toggle switch. Lever activated switches can be closed by moving an elbow, knee, chin, head, or even tongue. Sound activated switches can be operated by a person who can whistle or make a clicking sound. There is even a switch that is attached to the forehead by means of a sweat band. It is activated when the user wrinkles his brow. There are also circuits that can detect an electrical signal in a muscle and, in turn, activate a relay.

One of the most interesting switches is a pressure activated puff-sip switch like the Fairchild Model PSF 100A Pressure Sensor. This unique switch, which is shown here atop a keyboard, has an operating life of 1,000,000 on-off cycles. The switch is extremely sensitive and can be activated by an air pressure of only about 0.02 pound per square inch (psi). This is equivalent to the pressure of about half an inch of water or a gentle puff of air from a distance of a few inches. The switch has two ports. If the port marked low is left open, the switch will be triggered when a gentle puff of air is blown into the port marked high. If the port marked high is left open, the switch will be triggered when a gentle sip is

taken from the port marked low.

A disabled person who can move a finger over a distance of an inch or so can change the resistance of a slide resistor or potentiometer. The potentiometer can have a handle attached to its shaft to transform the linear motion of a moving finger into rotary motion. A person who cannot move a finger, hand, or toe can use head, chin, or tongue movements to change the setting of a slide resistor or potentiometer.

Light-sensitive cadmium sulfide photoresistors can also be used. The cell can be illuminated by either ambient light or a small flashlight bulb or LED mounted an inch or so away. Very small movements of a finger placed between the cell and the light source will cause the resistance of the cell to change. This method could also be used with the tongue and other parts of the body.

Of course electrical safety should be a concern when connecting a switch to a line-operated appliance like a personal computer. Even when connecting an external switch to low-voltage joystick switch terminals, it is important to be sure there is no danger of electrical shock. This precaution is particularly applicable if the switch is to be operated by a highly conductive part of the body like the tongue.

## A Single-Key Calculator

Listing 1 is a Basic program that transforms a computer into a single-key, five-function calculator. Though the program was developed with an IBM PCjr, it should work with any IBM-compatible machine. With a few simple revisions, it can be made to work with Microsoft Basic machines like the Radio Shack Color Computer.

Figure 1 shows a typical arithmetic problem as displayed by the calculator program. When the program is run, the small arrow travels under the "keyboard," pausing for a fraction of a second under each digit and function "key." The user selects a key by closing a switch connected to the left joystick switch port (STRIG (0)) when the arrow is under the desired key. I'll refer to this switch as the one on a joystick connected to the computer. However, it can be any of the special function switches discussed above. Selecting a function key automatically halts entry of the first number and permits the second number to be entered. Selecting the = key displays the result of the calculation. The arrow then resumes its scan.

Selecting C at any time clears the display and permits a new problem to be entered. The three symbols on the far right side of the display permit one of three scan speeds to be selected. The left arrow is slow, the bar is medium, and the right arrow is fast.

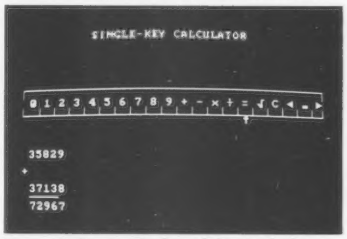



**Figure 1. Screen display of the single-key calculator in Listing 1.**

The calculator program is very straightforward and easy to modify. Indeed, you may wish to expand it to transform the basic calculator into a full-function business or scientific calculator. Referring to Listing 1, lines 10 through 50 perform basic housekeeping chores and can be easily modified. Line 60 sets the initial scanning speed of the moving arrow to the slowest of the three available rates (see line 300 and lines 580 through 600 below). Lines 70 through 150 draw the calculator keyboard and display, and lines 160 through 240 print the digits and symbols on the keyboard.

**Listing 1. Single-Key Calculator.**

```
10 'SINGLE-KEY CALCULATOR ("CALCU")
20 'COPYRIGHT 1985 BY FORREST M. MIMS III
30 KEY OFF:CLS:CLEAR
40 SCREEN 1:COLOR 1,1
50 A$="":B$="":F$="":'CLEAR DISPLAY SLOTS
60 TT=200:'INITIAL SCAN SPEED
70 'DRAW KEYBOARD
80 LOCATE 2,2:PRINT "         SINGLE-KEY CALCULATOR"
90 LINE (0,87)-(319,63),,B
100 LINE (7,163)-(39,163)
110 X=19
120 FOR N=1 TO 19
130 LINE (X,79)-(X,87)
140 X=X+16
150 NEXT N
160 'PRINT KEY LABELS
170 C=1
180 FOR N=0 TO 9
190 LOCATE 10,C
200 PRINT N
210 C=C+2
220 NEXT N
230 LOCATE 10,22:PRINT "+ - x ";CHR$(246);" = ";CHR$(251);" C"
240 LOCATE 10,36:PRINT CHR$(17);" ";CHR$(22);" ";CHR$(16)
250 'SCAN KEYBOARD
260 U=2
270 FOR S=0 TO 19
280 LOCATE 12,U
290 PRINT CHR$(24):'PRINT ARROW
300 FOR T=0 TO TT:NEXT T:'SCAN SPEED
310 ON STRIG(0) GOSUB 380:'DETECT SWITCH CLOSURE
320 STRIG(0) ON
330 LOCATE 12,U
340 PRINT " ":'ERASE ARROW
350 U=U+2:'MOVE ARROW TO NEXT KEY
360 NEXT S
370 GOTO 260
380 'READ SELECTED KEY
390 STRIG(0) OFF:'STOP DOUBLE ENTRIES
400 IF S=0 THEN S$="0"
410 IF S=1 THEN S$="1"
420 IF S=2 THEN S$="2"
430 IF S=3 THEN S$="3"
440 IF S=4 THEN S$="4"
450 IF S=5 THEN S$="5"
460 IF S=6 THEN S$="6"
470 IF S=7 THEN S$="7"
480 IF S=8 THEN S$="8"
490 IF S=9 THEN S$="9"
500 IF S>9 THEN S$=""
510 IF S=10 THEN F$="+":GOTO 770
520 IF S=11 THEN F$="-":GOTO 770
530 IF S=12 THEN F$="x":GOTO 770
540 IF S=13 THEN F$=CHR$(246):GOTO 770
550 IF S=14 THEN T$="=":GOTO 680
560 IF S=15 THEN F$="SQR":GOTO 680
```

*(continued on next page)*

Lines 250 through 370 generate the scanning arrow and move it along the keyboard. Line 300 is a delay loop that determines the scan speed. Lines 310 and 320 detect when the joystick switch has been closed. Since line 270 assigns to the variable S a number equivalent to each key, the program automatically detects which digit or function has been selected. When the joystick switch is closed, line 310 directs program control to the subroutine between lines 380 and 670 that processes the selected digit or function.

Line 390 is necessary to disable the joystick switch-trapping function. Without line 390, selected digits will be entered twice. Lines 400 through 490 convert selected digits from numbers into string ($) values that can be assembled by lines 620 and 650 into numbers that can be displayed on the screen.

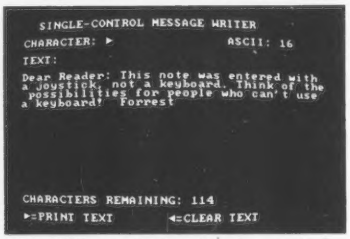

SINGLE-CONTROL MESSAGE WRITER
CHARACTER: ►
ASCII: 16
TEXT:
Dear Reader: This note was entered with a joystick, not a keyboard. Think of the possibilities for people who can't use a keyboard! Forrest
CHARACTERS REMAINING: 114
►=PRINT TEXT
◄=CLEAR TEXT

**Figure 2. Screen display of the two-control message writer in Listing 2.**

```
570 IF S=16 THEN GOTO 30
580 IF S=17 THEN TT=200:GOTO 260:'SLOW SCAN SPEED
590 IF S=18 THEN TT=150:GOTO 260:'MEDIUM SCAN SPEED
600 IF S=19 THEN TT=100:GOTO 260:'FAST SCAN SPEED
610 IF F$="" THEN 620 ELSE 650:'SELECT A OR B ENTRY
620 A$=A$+S$:'ASSEMBLE A$
630 LOCATE 16,2:PRINT A$
640 RETURN
650 B$=B$+S$:'ASSEMBLE B$
660 LOCATE 20,2:PRINT B$
670 RETURN
680 'CALCULATION ROUTINE
690 A=VAL(A$):B=VAL(B$):'CONVERT NUMBERS FROM TEXT STRINGS TO NUMBERS
700 LOCATE 22,1
710 IF F$="+" THEN PRINT A+B:'ADD
720 IF F$="-" THEN PRINT A-B:'SUBTRACT
730 IF F$="x" THEN PRINT A*B:'MULTIPLY
740 IF F$=CHR$(246) THEN PRINT A/B:'DIVIDE
750 IF F$="SQR" THEN PRINT "SQR =";SQR( A):'SQUARE ROOT
760 GOTO 260:'RESUME KEYBOARD SCAN
770 LOCATE 18,1:PRINT F$:'PRINT SELECTED FUNCTION
780 GOTO 260
```

**Listing 2. Two-Control Message Writer.**

```
10 'SINGLE-CONTROL MESSAGE WRITER ("TYPE")
20 'COPYRIGHT 1985 BY FORREST M. MIMS III
30 CLS:KEY OFF:CR=255
40 LOCATE 1,1:PRINT "  SINGLE-CONTROL MESSAGE WRITER"
50 LOCATE 3,1:PRINT "CHARACTER: "
60 LOCATE 3,28:PRINT "ASCII: "
70 LOCATE 5,1:PRINT "TEXT:"
80 LOCATE 21,1:PRINT "CHARACTERS REMAINING: "
90 LOCATE 23,1:PRINT CHR$(16);"=PRINT TEXT"
100 LOCATE 23,20:PRINT CHR$(17);"=CLEAR TEXT"
110 'PRESENT CHARACTERS
120 X=STICK(0):'READ JOYSTICK
130 IF X>8 AND X<14 THEN 120:'TRAP UNWANTED CLEAR
140 LOCATE 3,12:PRINT CHR$(X);"     ":'PRINT CHARACTER
150 LOCATE 3,34:PRINT X:'PRINT ASCII
160 IF X>27 AND X<32 THEN LOCATE 3,12:PRINT "CURSOR"
170 IF X=32 THEN LOCATE 3,12:PRINT "SPACE"
180 ON STRIG(0) GOSUB 210:'DETECT SWITCH CLOSURE
190 STRIG(0) ON
200 GOTO 120
210 'ASSEMBLE CHARACTERS ON SCREEN; PRINT AND CLEAR TEXT
220 STRIG(0) OFF:'STOP DOUBLE ENTRIES
230 IF X=16 THEN LPRINT A$:GOTO 120:'PRINT TEXT
240 IF X=17 THEN A$="":GOTO 30:'CLEAR TEXT
250 CR=CR-1:'CHARACTER COUNTER
260 IF CR<1 THEN LOCATE 21,23:PRINT "MEMORY FULL":GOTO 120
270 LOCATE 21,23:PRINT CR
280 X$=CHR$(X):'CONVERT ASCII TO TEXT
290 A$=A$+X$:'ASSEMBLE LINE OF TEXT
300 LOCATE 7,1:PRINT A$
310 FOR Q=1 TO 200:NEXT Q:'KEY DEBOUNCER
320 RETURN
```

Incidentally, experienced programmers will probably wonder why I didn't condense lines 400 through 490 into something much simpler, perhaps: IF S<10 THEN S$=STR$(S). This single line replaces the ten lines of 400 through 490, but it causes spaces to be placed between the digits. Since the answer is printed without the spaces, I decided to use the longer version.

Lines 510 through 540 detect the selection of the first four function keys and print the selected function on the screen (lines 770 and 780). If the = or SQR (square root) key has been selected, line 550 or 560 transfers program control to the calculation routine at lines 680 through 760. Notice that the selected function is assigned to the variable F$ and that the = key is assigned to the variable T$. Line 570 detects when the clear key has been selected. When this occurs, program control is transferred back to line 30. This clears the screen and restarts the program. Lines 580 through 600 set the keyboard scan rate as described above.

Line 610 detects whether a function key has been selected. If not, then the selected digit is assembled into a string along with previously selected digits and printed on the screen by lines 620 through 640. If a function key has been selected, the selected digit is assembled into a second string which is then printed on the screen below the first.

The actual calculations are performed by the routine in lines 680 through 760. Remember that the numbers displayed on the screen are strings of characters. Therefore, line 690 is necessary to convert the strings back into numbers. Lines 710 through 750 check the selected function in F$ and then perform the indicated calculation. The result is then printed on the screen.

## A Two-Control Message Writer

Imagine a personal computer without a display. The machine is no less capable; it simply cannot inform its user of what it is doing or has done. I suppose a person with a severe physical disability but normal reasoning and intellectual abilities must feel a little like that computer.

The scanning approach in the calculator program in Listing 1 can be used to implement a simple message writer for a handicapped person who can close a single switch. Instead of a keyboard, the screen would show the letters of the alphabet and various other symbols. The

switch would be closed when a scanning arrow pointed to the desired character.

Though the scanning method will work, I have developed the experimental program given in Listing 2 to provide somewhat faster results. Instead of an automatic scanning function used in Listing 1, the program in Listing 2 permits the handicapped user to select a character by altering the resistance of a variable resistor or potentiometer. The joystick, external potentiometer, slide resistor, or photoresistor can be used.

When the desired character has been selected, a switch is closed to print it on the screen. A message can contain up to 255 characters. An on-screen counter informs the user how many characters are remaining. At any time the message can be cleared or printed by selecting the arrow symbols shown on the screen. Incidentally, the program in Listing 2 permits the user to print any character or symbol listed in the ASCII character code.

Figure 2 is a screen photograph that shows a message generated with the message writer program in Listing 2. Though this program requires both a switch and a variable resistor, there is no reason why both of these devices cannot be assembled into a single fixture. For instance, a subminiature microswitch could be attached to the handle of a slide resistor or the shaft of a potentiometer. In this fashion, the user could type messages with a single finger or other part of the body that could be moved.

I make no claims that entering text with this experimental program is as easy or as efficient as a keyboard. On the contrary, it is very tedious and time consuming. Moreover, a few characters may be difficult to enter if the variable resistance device has a slightly non-uniform resistance at certain settings. For instance, the joystick I used made it more difficult to select the letters A and I than other characters. But the program does work. And it illustrates one of the ways an ordinary computer can be used to help a severely disabled person communicate with the outside world.

Like Listing 1, Listing 2 was developed with a PCjr. It should run with IBM PC-compatible machines, and it can be revised to run on computers that use Microsoft Basic. The program is very simple and easy to modify. Referring to Listing 2, lines 10 through 100 perform housekeeping tasks and place prompts and labels on the screen. Note that line 30 sets the characters remaining variable, CR, to an initial value of 255.

Lines 110 through 200 present characters on the screen according to the resistance applied to joystick port 0. Line 130 traps unwanted clears that can result when certain non-character ASCII codes are selected (tab, linefeed, home, form feed and carriage return). Lines 160 and 170 inform the user if the selected character is a cursor arrow or a space. This helps prevent mistaken selection of the up arrow when a space was intended.

A selected character is printed in the text section of the screen when joystick switch 0 is closed. The switch closure is detected by lines 180 and 190 which transfer program control to the subroutine at lines 210 through 320. Line 220 disables the switch trapping instruction to prevent unwanted double entries. Line 230 detects when the print symbol has been selected. If it has, the message string is sent to the printer. Line 240 detects when the clear symbol has been selected. If it has, program control is transferred back to line 30, and the text string is cleared.

Lines 250 through 270 keep track of the characters remaining in the text string (A$) and print the result on the screen. Line 280 converts the selected character from ASCII to text. Line 290 adds the selected character to the text string, and line 300 prints the assembled text string on the screen. Line 310 is a delay loop which is included to prevent inadvertent multiple character entries. If multiple entries are desired, just continue pressing the selected key.

## Going Further

Since the programs given here have not been tested with disabled people, they should be considered experimental. Perhaps they will give you some ideas about other ways for assisting the severely handicapped with personal computers.

For starters, you might want to try one or both of these programs with a disabled friend or relative. Using their suggestions, you can then revise the programs given here to include new features. And you can consider developing completely new programs. For instance, you might want to develop a message writer program that automatically scans the alphabet much like the Tufts Interactive Communicator.

For more information about computers and the disabled, see Peter Bates' article, "New Developments in Handicapped Access," in the March 1985 issue of *Creative Computing*. ■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# Legible Listings

You can make your Basic program listings easier to read with one of these five programs/**David H. Ahl**

Are your Basic program listings difficult to follow? At the end of a line, do you find it annoying to have words broken in the middle? When you try to debug a program, is it hard to find the beginning and end of each FOR loop? Well, help is on the way.

In the September 1983 issue of *Creative Computing*, we ran a short program to produce legible listings on the Tandy Model 100. At the end of the article, we challenged readers to write improved programs for other computers. The outpouring was overwhelming. We received nearly 100 programs for 20 different computers.

We chose the best program for each of five computers—Apple, Atari, Commodore 64, TRS Model I/III/4, and Kaypro (MBasic)—to present here. A few notes are presented with each listing which explains how it works. Minimally, each program separates multiple statements on one line into separate lines, but, as a glance at the listings shows, some of them do far more than that.

Needless to say, these programs don't make a structured program out of an unstructured one, or make a convoluted program into a straightforward one. They do, however, make reading the program listing of any program far easier.

### Apple

We received many entries for the Apple, in both Basic and machine language. We felt that the ideal program should be fast, simple, and elegant. Thus, we eliminated several of the machine code programs, which were more than five pages long, and some of the Basic programs, which were very s-l-o-w.

The winning program was submitted by Rajiv P. Sarathy, a student in the University of Toronto Schools. You can either type in the machine language program and assemble it, or you can type in the memory dump. If you choose to go with the memory dump, type it as follows:

0300:A9 0B 85 36 A9 03 85 37

### Atari

Like the Apple, the Atari saves programs as tokenized files. All of the Atari entries required that the program to be listed be converted to an untokenized (text) file, an inelegant but workable approach. To save a program in this format, you must load it into the computer and then LIST it back to the disk or cassette tape. You then execute the NEW command and load and run the program.

**Each program separates multiple statements onto separate lines and inserts pages breaks, but some do even more.**

### Commodore

All of the Commodore entries also required that the program to be listed be saved as an untokenized file on disk or cassette tape. The instructions for doing this are included in the program notes.

### TRS-80 Models I, II, III, and 4

We received more entries for the TRS-80 family of computers than for any other. Again, all of them require programs to be saved as untokenized files. On the TRS-80, this can be done with the command:

SAVE "filename/ext",A

Jean Phillippe Jobe of Panama submitted a particularly sophisticated program that allowed setting of printer codes for normal, condensed, or emphasized type; automatic insertion of a line of dashes following each line with an END, RETURN or RUN; indentation for each FOR loop; and a very fancy heading on each page. Unfortunately, the program was 180 lines long so we chose to print a shorter program by Sylvan Butler.

### Microsoft Basic

Although Applesoft Basic and TRS-80 Basic are derivatives of Microsoft Basic, they have subtle differences between "standard" Microsoft Basic as found on the IBM PC (and clones) and CP/M systems such as the Kaypro. Hence, we lumped all the entries in Microsoft Basic together and chose as the winner the one from Walter Castles written for the Kaypro II.

Somewhat surprisingly, these programs were the least sophisticated of all those submitted. Could it be that owners of machines of this kind use mostly off-the-shelf software and aren't into programming?

### Other Computers

We also received programs for the TRS-80 Color Computer, Epson HX-20, TI 99/4A, Timex Sinclair 1000, and several others. However, we think that if you have one of these machines, or any other computer, you can study the techniques in the program listings presented here and easily write a program for your computer. Good programming!

## Apple Program Notes

Writing this program, I soon realized that it was not as easy as I originally thought it would be. This was because it was a cumbersome ordeal to save an Applesoft program in ASCII, since the computer saves it as tokens. I decided there should be an easier way. "Why not convert the tokens using the LIST routine?" I asked myself.

Lines 3 through 7 are just EQUates, telling the assembler where these locations are. CSWL and CSWH are pointers that tell DOS where to find the routine that disposes of output characters. $46 hex is where the computer stores the X-register when the IOSAVE routine is called. Lines 11 through 15 set up the CSWL and CSWH pointers. The

assembler I used, Lisa 1.5, uses #LABEL and /LABEL for low and high bytes, respectively. Line 15 jumps to the routine where DOS reconnects the keyboard and screen streams.

When a character is to be output, DOS sends it to line 19. Line 19 checks to see if the character is a return/ linefeed. If so, it branches to the routine that takes care of the return (line 34). Next, it checks to see if the character is a colon. If not, it prints the character. It then prints the colon, and goes to the routine (line 34) that handles a return. Following the return, four spaces are sent to the printer. (In line 25, put the number of spaces minus 2.) Lines 32 and 33 are storage points within the program for various values.

Line 34 increments the number of lines printed, then checks to see if it is 65. This is for 66-line paper. If 65 lines have not been printed, the program sends a CRLF, and returns. If 65 lines have been printed, it prints the string and a CRLF, and returns.

Line 58 contains the length of the string; the string is placed in line 59 and onwards. (The Basic program shows how to enter a string.) This string will be printed on the first line of every page.

To use the program type the following from Basic:

```
CALL 768:CALL 823
LIST
```

This program can be used in Integer Basic and Applesoft Basic and in your own programs that use either the simple PRINT statement or the monitor's COUT subroutine.

Some assemblers, such as Lisa 1.5 equate characters in quotes (lines 21 and 27) with the high bit low, as in my listing. For the program to work, you need to change it to high bit on. After typing in the memory dump, or assembling the program, type:

```
CALL-151 (from Basic)
310:BA
31F:A0
```

*—Rajiv P. Sarathy*

**Apple Program Listing.**

```
0300                1           ORG $0300
0300                2  ;
0300                3  PRINT    EQU $C102          ;PRINT CHAR ROUTINE ON PRINTER CARD
0300                4  DOS      EQU $03EA          ;RESET DOS INTERCEPTS
0300                5  CSWL     EPZ $36
0300                6  CSWH     EPZ $37
0300                7  XSTORE   EPZ $46            ;IOSAVE X STORAGE
0300                8  ;
0300                9  ;THE NEXT SET OF INSTRUCTIONS SET UP THE PRINTFORMAT ROUTINE
0300               10  ;
0300 A90B          11  SETUP    LDA #START         ;THIS IS THE SAME AS LDA #<START
0302 8536          12           STA CSWL
0304 A903          13           LDA /START         ;THIS IS THE SAME AS LDA #>START
0306 8537          14           STA CSWH
0308 4CEA03        15           JMP DOS
030B               16  ;
030B               17  ;PROGRAM
030B               18  ;
030B C98D          19  START    CMP #$8D           ;IS IT A CRLF?
030D F01E          20           BEQ COUNT          ;YES? GOTO RET-COUNT SUBR.
030F C93A          21           CMP #':'           ;IS IT A COLON?
0311 D015          22           BNE OUTPUT         ;IF NOT, PRINT CHARACTER
0313 2002C1        23           JSR PRINT          ;PRINT COLON
0316 202D03        24           JSR COUNT          ;CHECK COUNTER, AND PRINT A CRLF
0319 A902          25           LDA #$02
031B 8D2B03        26           STA PTR1
031E A920          27           LDA #' '           ;GET A SPACE CHAR
0320 2002C1        28  SPACE    JSR PRINT          ;PRINT A SPACE
0323 CE2B03        29           DEC PTR1
0326 10F8          30           BPL SPACE
0328 4C02C1        31  OUTPUT   JMP PRINT
032B 00            32  PTR1     BRK
032C 00            33  PTR2     BRK
032D EE2C03        34  COUNT    INC PTR2
0330 AD2C03        35           LDA PTR2
0333 C941          36           CMP #$41           ;DOES POINTER 2 CONTAIN 65 DEC?
0335 D024          37           BNE PRCRLF         ;IF NOT, PRINT CRLF AND RETURN
0337 A900          38           LDA #$00           ;YES, 65 LINES HAVE BEEN PRINTED
0339               39  ;
0339               40  ;PRINT STRING AT TOP OF PAGE
0339               41  ;
0339 8D2C03        42           STA PTR2
033C AD6003        43           LDA LEN            ;GET LENGTH OF STRING
033F 8D2B03        44           STA PTR1
0342 8646          45           STX XSTORE
0344 A200          46           LDX #$00
0346 BD6103        47  NEXT     LDA STRING,X       ;GET NEXT CHAR
0349 C98D          48           CMP #$8D           ;IS IT A RETURN?
034B D003          49           BNE CHAR           ;IF NOT, PRINT CHAR
034D EE2C03        50           INC PTR2           ;INCREMENT LINE COUNT
0350 2002C1        51  CHAR     JSR PRINT          ;PRINT CHAR IN ACC.
0353 E8            52           INX
0354 CE2B03        53           DEC PTR1
0357 10ED          54           BPL NEXT
0359 A646          55           LDX XSTORE
035B A98D          56  PRCRLF   LDA #$8D
035D 4C02C1        57           JMP PRINT
0360 00            58  LEN      HEX 00
0361 00            59  STRING   HEX 00
                   60           END
```

**Apple Memory Dump.**

```
]CALL-151

*300.362

0300- A9 0B 85 36 A9 03 85 37
0308- 4C EA 03 C9 8D F0 1E C9
0310- 3A D0 15 20 02 C1 20 2D
0318- 03 A9 02 8D 2B 03 A9 20
0320- 20 02 C1 CE 2B 03 10 F8
0328- 4C 02 C1 00 00 EE 2C 03
0330- AD 2C 03 C9 41 D0 24 A9
0338- 00 8D 2C 03 AD 60 03 8D
0340- 2B 03 86 46 A2 00 BD 61
0348- 03 C9 8D D0 03 EE 2C 03
0350- 20 02 C1 E8 CE 2B 03 10
0358- ED A6 46 A9 8D 4C 02 C1
0360- 00 00 00
```

**Program to enter title string.**

```
]CALL 768:CALL 823
THIS IS AFTER APPLE-FORMATTERE
]LIST
5  REM  POKE STRING BY RAJIV PARTHASARATHY
7  REM  SEPTEMBER 1983
10  HOME :
    INPUT "STRING >";A$
20 X = 3 * 256 + 6 * 16:
    REM  'LEN'
30 A$ =  CHR$ (141) + A$:
    REM  PUT RETURN AT FRONT OF A$
40 A$ =  LEFT$ (A$,80):
    REM  TAKE FIRST 80 CHARS ONLY
50  POKE X, LEN (A$)
60  FOR I = 1 TO  LEN (A$):
    POKE X + I, ASC ( MID$ (A$,I,1)):
    NEXT I
70  END
```

## Atari Program Notes

This program is capable of listing either a disk or cassette file in LISTed format without merging. It also allows the use of a colon within a literal PRINT statement.

Lines 120 to 130 dimension variables and set up the page and flags. Line 140 determines if a disk or cassette file is to be used. If it is a cassette file, line 150 skips the directory search. Lines 160 to 200 open a file, read the specified disk directory, and print it to the screen for reference.

Lines 210 to 240 get the program name, the date, and page break information. Line 250 opens the specified file for input. This works for a cassette, even though cassettes don't have file names.

Line 260 prints the page heading, and 270 spaces it. Line 280 gets one character from the file. Line 290 checks to see if it is a quotation mark and updates the colon flag if needed. Line 300 checks for the Atari end of line marker CHR$(155). Line 310 adds the character to the line image string. Line 320 returns for another character if the present one is not a colon or if the colon flag indicates that it is in a literal PRINT statement. Line 330 prints the line image string and spaces the next line over four to produce the "fancy" listing.

Lines 340 and 350 check the line count and skip to the top of the next page if necessary. Finally, line 360 is the result of the trap on the end of file and closes the open file. *—Roy H. Nickum, Jr.*

**Atari Program Listing.**

```
Program FANCY   08/15/83   Page 1

100 REM ATARI Program to produce "fancy" listings
110 REM by Roy H. Nickum Jr.
120 DIM DEVICE$(3),NAME$(11),FILE$(18),DATE$(8),
    C$(1),CHARACTER$(1),IMAGE$(80)
130 PAGE=0:
    LENGTH=66:
    COLON=1
140 ? "The program to be listed is:":
    ? "      <C:> on cassette":
    ? "      <Dn:> on disk drive n":
    INPUT DEVICE$
150 IF DEVICE$="C:" THEN GOTO 210
160 TRAP 200:
    FILE$=DEVICE$:
    FILE$(LEN(FILE$)+1)="*.*":
    ?
170 OPEN #1,6,0,FILE$
180 FILE$="":
    FOR I=1 TO 18:
    GET #1,C:
    FILE$(LEN(FILE$)+1)=CHR$(C):
    NEXT I
190 ? FILE$;:
    GOTO 180
200 ? FILE$:
    CLOSE #1
210 ? "Program Name (must be in LISTed form)":
    INPUT NAME$
220 ? "What is today's date <nn/nn/nn>":
    INPUT DATE$
230 ? "The program is to be listed:":
    ? "      <C> continueously":
    ? "      <P> in pages":
    INPUT C$
240 IF C$="C" OR C$="c" THEN NOPAGE=1
250 FILE$=DEVICE$:
    FILE$(LEN(FILE$)+1)=NAME$:
    OPEN #1,4,0,FILE$:
    TRAP 360
260 PAGE=PAGE+1:
    LPRINT "Program ";NAME$;"    ";DATE$;"    ";
    "Page ";PAGE
270 LPRINT :
    LINE=2
280 GET #1,C:
    CHARACTER$=CHR$(C)
290 IF CHARACTER$=CHR$(34) THEN COLON=1-COLON
300 IF CHARACTER$=CHR$(155) THEN LPRINT IMAGE$:
    IMAGE$="":
    LINE=LINE+1:
    GOTO 340
310 IMAGE$(LEN(IMAGE$)+1)=CHARACTER$
320 IF CHARACTER$<>":" OR  NOT COLON THEN 280
330 LPRINT IMAGE$:
    IMAGE$="    ":
    LINE=LINE+1
340 IF NOPAGE OR LINE<=56 THEN 280

--------------------------------------------------------------------------------

Program FANCY   08/15/83   Page 2

350 FOR COUNTER=LINE TO LENGTH:
    LPRINT :
    NEXT COUNTER:
    GOTO 260
360 LPRINT IMAGE$:
    CLOSE #1:
    END
```

## Commodore Program Notes

This program is for any Commodore computer with Basic 4.0, a disk drive, and a 4022 or 8023 printer. Unlike the original program, this version will not break a program line if the colon is in a literal string.

The program, unfortunately, must read the disk file a single character at a time. Commodore disk input is somewhat unusual, and a single-character GET is the only way to insure an accurate read when the file may contain commas, colons, or quotation marks.

Using this program requires that a text version of the program to be listed be stored in a disk file named list.file. The following code creates a list.file containing a listing of the program currently in memory:

```
SCRATCH "list.file"
DOPEN #1, "list.file",W
CMD 1:LIST
PRINT #1:CLOSE 1
```

You should now load and run the formatting program. The program will prompt you for the date, the title to give the listing, choice between continuous or paged printing, and upper- or lowercase printout. Uppercase mode prints uppercase letters and graphics characters used in most game listings; lowercase mode prints lower- and uppercase letters. The program defaults to continuous printout and uppercase printout.

The reversed (white on black) characters in the listing are control codes. The reversed S represents clear screen, and the reversed right bracket represents cursor left. These codes are entered with the shifted CLR/HOME and shifted CRSR/left-right keys, respectively.

To use this program with a Commodore 64, Vic 20, or Pet with Basic 2.0 change the file OPEN commands in line 180 and the printer lowercase control in line 177. The rest of the program can be used almost as-is. Similar changes allow the program to be used with a cassette system. *—Robert R. Madson*

**Commodore Program Listing.**

```
100 rem program to generate 'prettyprint' listings
110 rem original by david ahl for trs-80 model 100
115 rem revised by robert madson for commodore computers w/basic 4,disk
120 print"■"chr$(14);
140 pg=0:
      z=65:
      q$=chr$(34):
      rt$=chr$(13)
145 print"A text listing of the program must be in file 'list.file'."
150 input"date  .■■■";d$
160 input"Title for program  .■■■";n$
170 input"output (c)ontinuous or (p)aged  c■■■";c$
175 input"(u)pper or (l)ower case  u■■■";ul$
177 if ul$="l" then open 7,4,7:
      print#7:
      close 7:
      rem lowercase mode
180 dopen#1,"list.file":
      open 2,4
190 pg=pg+1:
      print#2:
      print#2:
      print#2:
      print#2,"program "n$ "   "d$" -- page"pg
200 print#2:
      lc=5
210 get#1,in$:
      if st<>0 then x=1:
      goto 300
212 if in$=q$ then qm=abs(qm-1)
215 if in$=rt$ then qm=0:
      goto 250
220 pr$=pr$+in$
230 if in$<>":" or qm=1 then 210
250 print#2,pr$
255 lc=lc+1
260 pr$="":
      if in$=":" then pr$="       "
270 if c$="c" or c$="C" then 210
280 if lc>=56 then 310
285 goto 210
300 print#2,pr$:
      lc=lc+1
310 for j=lc to z:
      print#2:
      next
320 if x<>1 then 190
330 close 1:
      close 2
340 open 8,4,8:
      print#8:
      close 8:
      rem restore uppercase mode
```

## TRS-80 Model III Program Notes

To run this program, save the program to be listed in ASCII format on disk and then run the lister program.

Line 50 clears the screen and some string space, defines all variables as integers, and displays the title. Line 60 sets the page length (PL) and the minimum lines to print (LP). Lines 70 to 100 ask for a filename, open the file, and ask if you want a continuous listing or one separated into pages.

Lines 110 and 120 increment the pages printed (PG), print a page title, skip the next line, and set the line counter (LC) for the two lines printed.

In line 130, one line of the program is read from disk, and the end of file is tested.

Lines 140 and 150 separate the line number from the remainder of the line, and set the print string (P$) equal to the line number.

In line 160 the search starting position (P) is set to zero to check the entire line. The loop in lines 170 to 190 finds a colon and checks whether it is between quotes or not. If so, the search starting position is incremented to the closing quotes, and the loop is repeated.

Line 200 adds the characters in the line, up to and including the colon, to the print string, and GOSUBs the print routine. On return, the print string is set equal to as many spaces as there are digits in the line number, plus one. What was printed is subtracted from the line in 210 and the line is tested for characters remaining.

Lines 220 and 230 test whether pagination is wanted and enough lines have been printed. If so, blank lines are printed to move the next page. Line 240 is executed when the end of file is reached. It then closes the file, clears the screen, and terminates program execution.

Line 250, a subroutine, prints the characters stored in the print string and increments the line counter.

FANCYLST/BAS will work with most programs, but a long print statement without colons will cause the line count in the program to be inaccurate.

*—Sylvan D. Butler*

**TRS-80 Model III Program Listing.**

```
10 'Program to produce "fancy" listings.  TRS-80 Model 100
20 'original by David Ahl, Creative Computing.
30 'TRS-80 Model III w/disk modification
40 'by Sylvan D. Butler  08/19/83
50 CLS:
   CLEAR1000:
   DEFINTA-Z:
   PRINTTAB(26)"FANCY LISTER"
60 PL=66:
   LP=60:
   PRINT:
   PRINT
70 LINEINPUT"What is the program name (ASCII file)? ";N$
80 OPEN"I",1,N$:
   PRINT:
   PRINT"Do you want the listing"
90 PRINT"continuous -- (C)":
   PRINT"or in pages - (P)?":
   PRINT
100 INPUT"What is your choice, C or P";C$
110 PG=PG+1:
    LPRINT"Program   "N$TAB(44)"Page"PG
120 LPRINT:
    LC=2
130 LINEINPUT#1,IL$:
    IFEOF(1)THEN240
140 ND=INSTR(1,IL$," "):
    N$=LEFT$(IL$,ND)
150 L$=RIGHT$(IL$,LEN(IL$)-ND):
    P$=N$
160 P=0
170 P=P+1:
    Q=INSTR(P,L$,CHR$(34)):
    C=INSTR(P,L$,":")
180 IFC=0THENC=LEN(L$)
190 IFQ>0ANDQ<CTHENP=INSTR(Q+1,L$,CHR$(34)):
    GOTO170
200 P$=P$+LEFT$(L$,C):
    GOSUB250:
    P$=STRING$(ND,32)
210 L$=RIGHT$(L$,LEN(L$)-C):
    IFL$>""THEN160
220 IFLC<LPORC$="C"ORC$="c"THEN130
230 FORI=LCTOPL:
    LPRINT:
    NEXTI:
    GOTO110
240 CLOSE:
    CLS:
    END
```

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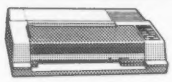

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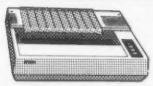

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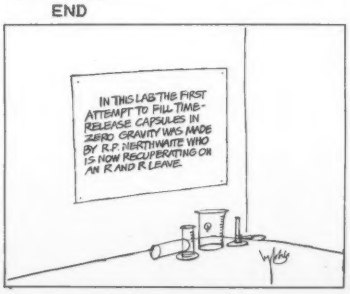
## Microsoft Basic Program Notes

The only requirement to run this program is that the program you want to list be saved on the disk in ASCII format. This is done at the time the program is saved by adding a comma and a capital A after the name of the program, i.e. SAVE"FORMLIST.BAS",A.

The only line that is machine specific is line 110. The "PRINT CHR$(26)" statement is used to clear the screen on the Kaypro. —*Walter I. Castles*

**Microsoft Basic Program Listing.**

```
100 'FORMLIST by
    WALTER I. CASTLES
110 PRINT CHR$(26):
    CLEAR 2000:
    PG=1:
    Z=65
120 PRINT"Print formated
    program listing":
    PRINT
130 INPUT"Program name";N$
140 INPUT"List continuous (C)
    or in pages (P)";C$
150 LPRINT"Program
    ";N$;TAB(40)"Page";PG:
    LPRINT:
    LC=2
160 OPEN"I",1,N$
170 LINE INPUT#1,A$:
    L1=LEN(A$):
    PR$=""
180 FOR C=1 TO L1:
    B$=MID$(A$,C,1):
    PR$=PR$+B$
190 IF B$=CHR$(34) AND F1=0
    THEN F1=1:
    GOTO 210
200 IF B$=CHR$(34)
    AND F1=1 THEN F1=0
210 IF B$=":" AND F1=0 THEN
    GOSUB 290:
    PR$="    ":
    GOSUB 240
220 NEXT C
230 GOSUB 290:
    PR$="":
    GOSUB 240:
    IF EOF(1) GOTO 300
    ELSE GOTO 170
240 IF C$="C" OR C$="c"
    THEN GOTO 280
250 IF LC<56 GOTO 280
260 FOR C1=LC TO Z:
    LPRINT:
    NEXT C1:
    PG=PG+1
270 LPRINT TAB(40)"Page";PG:
    LPRINT:
    LC=2
280 RETURN
290 LPRINT PR$:
    LC=LC+1:
    RETURN
300 CLOSE:
    END
```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CIRCLE 125 ON READER SERVICE CARD

# NOTEBOOK COMPUTING

## Password protect, less pricey Pivot, improved LCD for DG/1, RAM cards for Model 100 and NEC/John J. Anderson

When I first shared with you a password protect program I had written for the Model 100 (December 1984), I thought the practical advantages of such a program were enough to justify it. Since then, I have grown to appreciate the topic purely on the basis of its academic challenge. In the March 1985 column, I noted that Mark Cridland had punched a hole in my defenses, using the dedicated PRINT key, and it was back to the drawing board—not because I felt that many unauthorized users would actually find this sneaky chink in my program's armor, but because the search for the truly bulletproof security program is a noble one.

The other day I found the following message on *Creative Computing* Online:

"Just want to make you aware that a crack-proof machine code "log-on" program for the Tandy Model 100 is now available on the CompuServe Model 100 SIG (PSWDM.100 in Data Library 4). The program is self-loading from Basic, self-IPLing, and occupies a mere 237 bytes at the top of user memory when loaded. The program was born from a business need to protect my M100 text files from access (I work with a lot of confidential data). I have been able to bypass all the Basic programs I have found by quick stabs at the BREAK key before it is disabled, overflowing string storage with lengthy input, or other devious means, so I resorted to writing my own program using an assembler. I had to revise my first attempt after reading your column in *Creative* and discovering that the ROM routine I was using for character input could indeed be interrupted by the PRINT key (which reenables BREAK ). The current version monitors the keyboard buffer directly without calling the break-check routine (which enables the screen dump interrupt). So far, I haven't found any way around it, short of killing the power to RAM.

"A listing of the 8085 assembly mnemonics with comments (PSWDM.ASM) is also available in DL4, and demonstrates how to exploit several useful ROM routines. I have been informed that experimenting with bypass strategies (e.g. pushing the reset switch twice while the menu is coming up if the program is IPLing) can result in mangling of RAM files and/or a cold start, so do warn your readers to back up their files before playing detective. I haven't discovered any other destructive behavior.

"Love your magazine, love your column, and of course I love my Model 100. Keep up the excellent work!—Keith Bergendorff 72306,322"

A day or so later I got the following update from Keith:

"Just a note to let you know I've upgraded my MC password program due to popular demand—new features are variable length ID code (1-8 characters), automatic power-down after 60 seconds, and more efficient 8085 coding. Still weighs in at less than 250 bytes.—KB"

I couldn't find a way through Keith's password protect program—can you? The creator program for it appears here as Listing 1. Have a go at it, but bear Keith's warnings in mind.

**Users can enter the portable arena immediately without running the risk of short-term product obsolescence.**

### Morrow Cuts Pivot by $1000

A $1000-per-unit price reduction on Morrow's Pivot portable computer is the company's first step in a no-risk program to let users buy current Pivot models with 16-line displays, trading them in later for upgraded 25-line versions.

The program calls for the price of Pivot Model 1622 with 256K bytes of RAM and two floppy disk drives to be reduced from $2995 to $1995; the Model 1662, with 640K and two floppies, drops from $3795 to $2795. Users will be able to trade in one of these models plus $1000 for the 25-line version of the Pivot after July 15, 1985.

According to company chairman George Morrow, the program ensures that users can enter the portable arena immediately, without running the risk of short-term product obsolescence.

He adds that the new 25-line display upgrade will be only one key feature of the new Pivot, which will be a "significant redesign of the original . . . a design that provides 100% IBM PC compatibility." To ensure display legibility, the new Pivot screen combines the quality of an electro-luminescent display with the low cost and power consumption of a liquid crystal display. Its white characters on a black background are crisp and easy to read under any lighting conditions.

We reviewed the original Pivot in the April 1985 issue of *Creative Computing*. That machine sports a CMOS 80C86 16-bit microprocessor and industry-standard MS-DOS 2.11, in an 11-pound package, measuring 13" x 5.6" x 9.5" It offers as standard ROM-based utilities six executive productivity functions, including personal appointment

scheduler, phone directory, and calculator.

### Screen Update for DG/1

Data General is shipping an improved, tilt-version of the original LCD that was a part of the Data General/One portable. That machine was reviewed in the February 1985 issue and had come under criticism for a relatively poor quality 25-line display.

The new LCD, also available as an upgrade for current DG/1 models, optimizes screen polarization, which substantially improves contrast quality. A continuous tilt adjustment lets users vary the viewing angle to obtain maximum screen clarity while minimizing glare. This increases readability in a wide range of lighting conditions.

The suggested list price for upgrades is $350. Owners may either return their current units to DG for upgrade or bring the units to authorized dealers. The procedure can normally be completed in 30 minutes.

New production units already feature the improved display, and have not affected the $2895 base price of the DG/1.

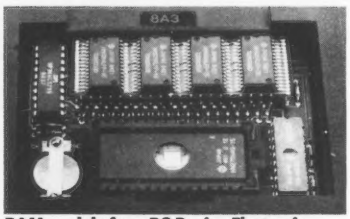
### 96K Model 100

PG Design Electronics has introduced 32K and 64K RAM modules for the Radio Shack Model 100. The modules fit neatly in the expansion compartment of the Model 100 and add RAM in banks of 32K to a maximum of 96K.

Each bank can be accessed from any of the other banks, and an optional data transfer program is available. The layout of the RAM module leaves the Model 100 ROM slot clear for use. The Video Disk Interface is provided for with a rugged, standard 40-pin connector.

The 32K module lists for $250, while the 64K module lists for $375. The 32K version may be upgraded at a later time for $150.

**New screen display and tilt control for the Data General/One.**



**RAM module from PG Design Electronics.**

### 128K NEC 8201

Purple Computing has announced an expandable memory cartridge called the Sidecar for the NEC 8201 portable. Unlike NEC's own 32K plug-in memory cartridge, the Sidecar cartridge is expandable to 128K organized as four banks of 32K.

The Sidecar plugs into the same slot as the NEC 32K cartridge and contains two standard AA batteries to maintain CMOS RAM when the computer is powered down. The batteries will last a year or more and can be replaced without loss of data.

The single unit list price for the basic 32K Sidecar is $349. User installable 32K banks are $145 for bank two, $175 for banks three and four. The Sidecar carries a one-year warranty. ■

### Firms Mentioned In This Column

Morrow Inc.
600 McCormick
San Leandro, CA 94577
(415) 430-1970

Data General Inc.
4400 Computer Dr.
Westboro, MA 01580
(617) 366-8911

PG Design Electronics Inc.
66040 Gratiot
Richmond, MI 48062
(313) 727-2744

Purple Computing
2068 Ventura Blvd.
Camarillo, CA 93010
(805) 987-4788

### Listing 1.

Any printable Model 100 characters can be used for your code, not just standard ASCII characters. WRITE DOWN YOUR ID CODE AND PUT IT UNDER YOUR MATTRESS! So far as we're aware, the only way to access the computer if you forget it after PW.CO has been run is a COLD RESET (aka "the big chill"). After the machine code has been loaded, you can SAVE the BASIC file to cassette or disk and erase it from RAM, as it will no longer be needed.

```
1 'PSWDM.100
2 'A machine code log-on program for
3 'the Tandy Model 100.
4 '
5 'Keith Bergendorff  [72306,322]
6 '
10 IFHIMEM>62723THENCLEAR256,62723
12 INPUT"Your ID code";PW$
14 IFLEN(PW$)<>5THENBEEP:PRINT"ID code
must be exactly 5 characters":GOTO12
16 PRINT,,"loading...";
18 AD=62723
20 FORI%=1TO5
22 POKEAD,ASC(MID$(PW$,I%,1)):AD=AD+1
24 NEXTI%
100 FORI%=1TO24
102 READH$
104 FORJ%=1TOLEN(H$)-1STEP2
106 P$=MID$(H$,J%,2)
108 GOSUB200
110 POKEAD,D%:AD=AD+1
112 NEXTJ%
114 NEXTI%
116 BEEP:PRINT"DONE"
118 SAVEM"pw",62723,62959,62836:END
200 PP$=LEFT$(P$,1):GOSUB250
210 D%=DD%*16:PP$=RIGHT$(P$,1):GOSUB250
220 D%=D%+DD%:RETURN
250 DD%=ASC(PP$)
260 IFDD%>47ANDDD%<58THENDD%=DD%-48
270 IFDD%>64ANDDD%<71THENDD%=DD%-55
280 RETURN
1000 DATA "2250572E434F000A2054
1010 DATA "52532D38302F4D6F6465
1020 DATA "6C203130300A0D206174
1030 DATA "20796F75722073657276
1040 DATA "6963652E0D0A0A20506C
1050 DATA "65617365206C6F67206F
1060 DATA "6E0D0A0A203E2000496E
1070 DATA "636F7272656374204944
1080 DATA "20636F6465000A205472
1090 DATA "79206167616E202020
1100 DATA "200D0A0A203E20002108
1110 DATA "F5CD781ACD3142CD3F14
1120 DATA "210FF5CDB127CDB3F5CA
1130 DATA "AAF5210302CD7C42CD69
1140 DATA "42214CF5CDB127CD6E42
1150 DATA "215EF5CD9157CDB3F5C2
1160 DATA "7AF5CD4E42CD2942C397
1170 DATA "572146FFE59706067723
1180 DATA "05C2BAF5CD4942CD4272
1190 DATA "CAC3F5E1FE0DCADCF577
1200 DATA "7DE680C03E20E723E5C3
1210 DATA "C3F52146FF1103F50605
1220 DATA "1ABEC0231305C2E4F57E
1230 DATA "B7C9
```

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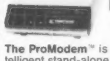

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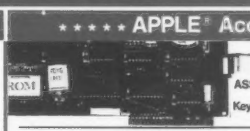


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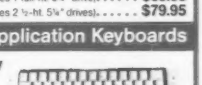

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| Z-200 (AT) | CALL |
| 171 (Portable) | CALL |
| 138 (Transportable) (NEW) | CALL |
| 148 (DeskTop) (NEW) | CALL |

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| MBC 550-2 Single Drive | $699.00 |
| MBC 555-2 Dual Drive | $969.00 |
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| MBC 511 10 meg | CALL |
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| IDEAshare Software | $219.00 |
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# APPLE CART

## Enhance your IIe, learn financial planning, new products/**Joe Desposito**

I thought there would be more time before I was forced to make the upgrade. But when a software package that I was reviewing flashed the message "needs a 65C02," I knew a decision had to be made.

The software product was one I spoke about in last month's column, Sorcim's *SuperCalc3a*. What surprised me about the message was that *SuperCalc3a* is not Macintosh-like with pulldown menus and mouse control. It seems as though Sorcim really has taken advantage of the features of the processor rather than the ROM features of the IIc.

So now the question: "Should I enhance my IIe and sacrifice IIe compatibility to gain IIc compatibility?" The enhancement, as was briefly mentioned in an earlier Apple Cart, affects four chips in the IIe. First is the 6502 (motherboard coordinate location B4). It is replaced with a 65C02, a CMOS version of the original chip. Besides requiring less power than its predecessor, the 65C02 has 27 additional instructions. Second and third are two monitor ROMs, the cd ROM and ef ROM (locations E8 and E10 respectively). Last is the character generator ROM (location F4).

Most compatibility problems are caused by the new character generator ROM, which contains a nest of mousetext characters between $40 and 5F. These characters replace flashing characters (which was a duplicate set) and uppercase inverse characters.

The upgrade costs about $70. In addition to the chip change, you receive a short manual that describes the changes and a sticker to put over the power light on the IIe keyboard. The problem with the upgrade is that your friendly dealer confiscates your original chip set. Thus, you lose forever IIe compatibility, which Apple estimates at only 5% of the total Apple II software universe, but which is in reality far greater. (When Apple speaks about compatibility, it often is referring to the latest upgraded versions of a product, which you may not have.)

**When you opt for the upgrade, you are assuring yourself of complete compatibility with all new software products.**

When you opt for the upgrade, you are assuring yourself of complete compatibility with all new software products. You also gain some additional benefits that IIc owners now enjoy. One is that you no longer have to keep track of the status of the CAPS LOCK key; you can type your Basic programs in upper- or lowercase. Another is that you will be able to boot ProDOS programs from a hard disk by placing the controller card in slot 7. You'll also notice that scrolling is a lot smoother after the upgrade. And for those who like to dabble in assembly language programming, a 6502 miniassembler is provided. Finally, whenever you turn on the computer, you will see Apple IIe displayed rather than Apple II.

Even greater than any of these immediate gains is the promise of a new breed of Macintosh-like software for the IIe/IIc. With an expanding universe of IIc machines, and with the converts from the IIe camp, software companies should be greatly encouraged to include pull-down menus and mouse support in their new products.

But the problem remains. Once you opt for the upgrade, you may find that some of your favorite programs, *Apple writer IIe* for instance, no longer function properly. Is there a way out of this dilemma? Yes there is, but it may take a little work.

If you have to give up your ROMs, you can always make backup copies of them. You'll need two 2764 EPROMs to copy the monitor ROMs and one 2732 EPROM to copy the character generator ROM. You can either do the copying yourself or have it done by an EPROM copying service. The only hitch when you use the copying service is that you must supply the code for the EPROM on disk.

Once you have the copies made, you can create printed circuit boards that hold two EPROMs but fit into one socket. An SPDT slide switch can be inserted into the 5-volt lines of the chips to power either the IIe or the IIc EPROM/ROM.

So if you want to have a finger in both pies, you can. One last parting comment: If you bought your IIe in March, 1985 or later, don't bother to bring it back to the dealer for the upgrade—you already have an enhanced machine.

### Squire Teaches Financial Planning

If you're the type of person who bought Sylvia Porter's books, but never found time to read them, you may want

to try a different tack in your quest to learn more about the dollars you work so hard to earn.

Blue Chip Software has produced a fascinating financial planning simulation called *Squire* for Apple II and Macintosh computers (as well as other models). By playing *Squire* you can learn how to make your money work for you. The program teaches you how to use different investment tools, such as stocks, bonds, IRAs, money market accounts, etc. to help you reach your financial goals.

A 73-page manual accompanies the software, though you needn't read through it to play. It serves as both an introduction to the game and a reference manual when you want to brush up on those facets of the game with which you are not familiar, like the commodities market.

You may have tried Blue Chip Software's other financial simulations, *Millionaire, Baron*, and *Tycoon*. Of all the Blue Chip products, I think *Squire* hits closest to home. It is an interesting and entertaining way to educate yourself about personal financial planning. Suggested retail prices of the Apple II and Macintosh versions are $59.95 and $69.95 respectively.

## New Product Announcements

It is nice to see that at least one company remembers that there is an Apple II+. Videx has just announced the *Appleworks Modifier*, which reconfigures the Appleworks startup disk so that the program can be used on an Apple II+ with a Videoterm 80-column card and the one-wire shift modification. Retail price is $49.

A most interesting product for the Apple IIc is a plug-in 300 baud portable modem that attaches to the game port at the rear of the computer. Called the ProModem 300c, it draws its power from the port, but doesn't leave you without a place to attach your mouse—it includes another game port in its 2-1/4" x 2-3/4" x 3" IIc colored case. The modem is from Prometheus Products, Inc. and sells for $199 with communications software included.

ProModem300c

Switchport232

Practical Peripherals has announced two new products: the Switchport IIc and the Switchport 232. Switchport IIc is a serial-to-parallel converter for the Apple IIc. It includes a utility disk containing graphics dump routines and Mousepaint drivers. The Switchport 232 is also a serial-to-parallel converter, but it works with any computer that has an RS-232c output. Both units have a suggested retail price of $109. ■

### Firms Mentioned In This Column

Sorcim Corp.
2310 Lundy Ave.
San Jose, CA 95131
(408) 942-1727

Blue Chip Software, Inc.
6744 Eton Ave.
Canoga Park, CA 91303
(818) 346-0730

Videx
1105 N.E. Circle Blvd.
Corvallis, OR 97330
(503) 758-0521

Prometheus Products, Inc.
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# COMMODORE'S PORT

## A quick quo vadis; the C128 revisited, animated graphics, whither RGB, autoboot camp

**John J. Anderson**

Commodore has made at least two significant strides since the last time we met here at the Port. First the Commodore 128 achieved general release, and then the finally completed Amiga machine made a limited debut (full review to appear next month). Commodore has taken the wraps off its next generation of machines. These are the computers through which it will attempt to capture its share of tomorrow's micro market.

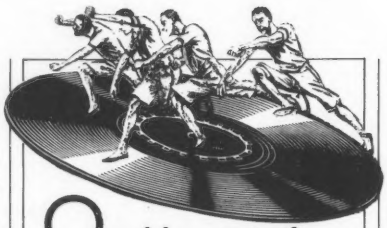
### Amiga—Great Byte Hope

The outlook for a bright Commodore tomorrow rests with the remarkable Amiga machine. Whether or not it is too late for the Amiga to reawaken a slumbering (or perhaps even hypnotized) market remains to be seen. It is a fine machine, nonetheless in desperate search of a lucrative niche. It will certainly find one among upscale enthusiasts and hobbyists. This group, as we have seen, does not a market make. Commodore will have to find a bigger role for the Amiga machine, if it is to pull itself out of its current quagmire and back into the profit column. This, unfortunately, means doing business where IBM waits with the micro equivalent of chains and tire irons. Oh Blue, you dog.

Without a doubt, the Amiga is a machine that will be supported by *Creative Computing*. We can only hope that the marketplace also supports it. If that happens, the Amiga—and Commodore—have very bright futures indeed.

### The C128: A Closer Look

Since I first reviewed the Commodore 128, I have logged many more hours with it, getting to know it on a more intimate level. It is quite a decent machine, certainly the friendliest of its lineage, but indubitably a Commodore through and through. Sometimes, frankly, its Commodality is a bit exasperating. One occasionally gets the queazy feeling that the machine is in actuality a Vic 20 wearing lipstick and designer jeans.



**One of the most significant features available on the new C128 is the capability to set an autorun file.**

For example, I cheerily reported last month that formatting disks on the new machine was simplicity itself: simply type HEADER "DISK NAME" and the drive lays down its format. Not quite so, it turns out—at least on the system with which we were supplied. You must use the format

HEADER "DISK NAME", I < indentifier >, D < drive# >, U < device# >

where < identifier > is the disk id tag, < drive # > is the drive number, and < device # > is the device number. So with a single disk system, you might type HEADER "DISK1",I00 ,D0 ,U8 to format a disk. Not quite as simple as outlined in Commodore's preliminary documentation. In fact, formatting this way is not much easier than doing it on a Commodore 64.

In other areas, however, Basic on the C128 far outshines that of its little brother. Listing 1 shows graphic use of the BOX command, Listing 2 the CIRCLE command, and Listing 3 the WINDOW command. Listing 4 shows the WINDOW command in 80-column format, and Listing 5 shows character-based animated graphics in the 80-column mode. The REMarks of each help make them self-explanatory.

Format for the BOX command is as follows:

BOX < color register >, < topleft row >, < topleft column >, < bottom right row >, < bottomright column >, < rotation >, < fill toggle >

By cycling the value of the color register and the rotation angle of the plot, Program 1 creates a multicolor animated plot. You can double the width of the plotted lines by sticking the command WIDTH 1 in someplace. To return to the default, type WIDTH 0. You'll find that a WIDTH command carries through even between programs and RUN/STOP-RESTORES, so type WIDTH 0 RETURN in the direct mode to deselect double width. If you want to plot solid rectangles, change the fill toggle from a 0 to a 1. Unfortunately, fills have a way of taking a lot of time.

Format for the CIRCLE command is along these lines:

CIRCLE < color register >, < center row >, < center column >, < x radius >, < y radius >

You can tack arc angles, rotation, and increments onto the CIRCLE command to draw curves, triangles, and polygons. But these are optional and unnecessary in the example shown here. Program 2 draws shrinking concentric circles in multicolors.

You'll note that the color changes are not totally "clean" (if you are sharp, you may have spotted this phenomenon even in Program 1), but rather spill over the edges of the plot, giving it a severe case of the jaggies. This is a holdover glitch in multicolor mode as it existed in the C64, and it remains embedded in the heart of the C128. The thing to do is work around it as best you can. It is another reminder that when it comes to Commodore, it's all in the family.

The WINDOW command is quite straightforward:

WINDOW < topleft column >, < topleft row >, < bottomright column >, < bottomright row >, < clear toggle >

Using this command, Program 3 sets up four windows in four different colors. Note that windows may overlap each other. Program 4 shows you the same idea in 80 columns, where its use can be even more effective.

As I mentioned in my review last month, graphics are not supported in 80-

column mode. Program 5 manages to get some running there, using a technique I first outlined in my book *Commodore 64 Sight and Sound*—that is, to loop through multicolor character graphics that have been designed to create a swirling pattern on the screen. Note that the program is a one-liner in terms of its business end.

It also runs the NTSC 40-column mode, creating an entirely different pattern as it scrolls.

## More on RGB

The 80-column RGB mode of the C128 is quite serviceable. The question is whether it will ever see much real application outside of the CP/M operating system, where it can run existing CP/M programs in a full 80-columns. The answer is doubtful, I would guess. Because a decent RGB monitor still costs much more than the C128 itself, it is quite likely that the C128 will default to its 40-column NTSC mode as the display of choice. Also, the 80-column mode is entirely unsupported from Basic 7.0. Listing 5 shows that character-based color graphics are possible, but this is about the extent of control from the 80-column mode, except from machine language (horrors!).

If, however, Commodore introduces a C128 80-column graphics cartridge or the like, the RGB mode of the C128 may indeed have a future. Its resolution is as sharp as that of the IBM PC, and by my reckoning offers the lowest-priced high-quality RGB output of any microcomputer. It would be a shame if this fine capability of the C128 were to end up ignored in favor of a graphics mode no better than that of the C64, with things like severe bleeding between incompatible colors and yucky jaggies in the multicolor mode.

## Autoboot Still Moot

One of the most significant features available on the new C128 is the capability to set an autorun file. Unbelievably, the C128 is the first Commodore computer to allow disk file autoboots. Insert a disk, turn on your computer, and bingo! You're up and running the program of your choice. However, setting an autoboot file on the C128 is also not quite as simple as it was initially reported to me, and as I reported to you. I was told that the BOOT command was used to effect this, and that is not the case. Unfortunately, there is no easy way to set the boot file from Basic. The autoboot information must be written to track 1, sector 0 of the disk in question. Bytes 0, 1, and 2 must set to CBM, and the next three bytes set with address low, high, and bank identifiers. Byte 6 gets the number of the disk block containing the code to which you wish to point. Then there is blank space for the disk name. This must terminate with a 0. Then comes the filename, which also terminates with a 0. This information is sufficient to autoload the program, but not to autorun it. The easiest way to autorun after loading is to pack the keyboard buffer with the characters "RUN RETURN", as I did in C64 MiniDOS 3.0. This requires some assembly code and a JMP instruction.

Soon, I hope to provide some Basic code that allows the setting of autoboot files without a lot of headaches. And as I said last month, I haven't given up on the idea of setting C64 autoruns using a hybridization of C128 features. Stay tuned. ■

**Listing 1.**

```
1 REM PROGRAM 1
2 REM EXPLORATION OF THE BOX COMMAND
9 REM ---------------------------------
10 COLOR 0,2:COLOR 4,2:REM SET BACKGROUND TO WHITE
20 GRAPHIC 3,1:REM SET MULTICOLOR MODE
30 X=1:Y=0:REM INITIALIZE--X WILL BE THE PENCOLOR, Y THE ANGLE OF THE BOX
40 BOX 2,17,50,140,150,Y,0:REM DRAW THE BOX
50 X=X+1:Y=Y+10:IF X=16 THEN X=1:REM INCREMENT X AND Y, CONSTRAIN X VALUE
60 IF Y=405 THEN Y=0:REM CONSTRAIN Y VALUE
70 IF X=2 THEN X=3:REM DISALLOW WHITE AS A PENCOLOR
80 COLOR 2,X:REM SET COLOR VALUE TO X
90 GOTO 40:REM LOOP BACK TO BOX COMMAND
```

**Listing 2.**

```
1 REM PROGRAM 2
2 REM EXPLORATION OF THE CIRCLE COMMAND
9 REM-----------------------------------
10 COLOR 0,2:COLOR 4,2:REM SET BACKGROUND COLOR TO WHITE
20 GRAPHIC 3,1:REM SET MULTICOLOR MODE
30 X=0:Y=0:REM INITIALIZE--X WILL BE DIAMETER INCREMENT, Y WILL BE PENCOLOR
50 CIRCLE 2,75,98,70+X,98+X:REM DRAW THE CIRCLE
60 X=X-2:Y=Y+1:IF Y=16 THEN Y=1:REM INCREMENT X AND Y, CONSTRAIN Y
70 IF Y=2 THEN Y=3:REM DISALLOW WHITE AS A PENCOLOR
80 COLOR 2,Y
90 IF X=-70 THEN GOTO 30
100 GOTO 50
```

**Listing 3.**

```
1 REM PROGRAM 3
2 REM THE WINDOW COMMAND IN 40 COLUMNS
9 REM ---------------------------------
10 PRINT"■":LIST:REM CLEAR SCREEN, LIST PROGRAM
20 WINDOW 2,2,12,8:REM SET FIRST WINDOW
30 FOR I=1 TO 99:PRINT"■WINDOW 1 ";:NEXT I:REM SET TO WHITE, PRINT LOOP
40 WINDOW 12,10,21,19:REM SET SECOND WINDOW
50 FOR I=1 TO 99:PRINT"■WINDOW 2 ";:NEXT I:REM SET TO YELLOW, PRINT LOOP
60 WINDOW 25,2,31,24:REM SET THIRD WINDOW
70 FOR I=1 TO 99:PRINT"■WINDOW 3 ";:NEXT I:REM SET TO CYAN, PRINT LOOP
80 WINDOW 3,17,35,21:REM SET FOURTH WINDOW
90 FOR I=1 TO 99:PRINT"■WINDOW 4 ";:NEXT I:REM SET TO GREEN, PRINT LOOP
100 GOTO 20:REM START ALL OVER AGAIN
```

**Listing 4.**

```
1 REM PROGRAM 4
2 REM THE WINDOW COMMAND IN 80 COLUMNS
3 REM SEE PROGRAM 3 FOR PERTAINING REMARKS
9 REM ---------------------------------
10 PRINT"■":LIST
20 WINDOW 10,10,25,20
30 FOR I=1 TO 99:PRINT"■WINDOW 1 ";:NEXT I
40 WINDOW 30,0,50,15
50 FOR I=1 TO 99:PRINT"■WINDOW 2 ";:NEXT I
60 WINDOW 55,5,66,20
70 FOR I=1 TO 99:PRINT"■WINDOW 3 ";:NEXT I
80 WINDOW 27,18,75,24
90 FOR I=1 TO 99:PRINT"■WINDOW 4 ";:NEXT I
100 GOTO 20
```

**Listing 5.**

```
1 REM PROGRAM 5
2 REM ANIMATED COLOR CHARACTER GRAPHICS IN 80 COLUMNS
3 REM ALSO RUNS IN 40 COLUMNS
9 REM ---------------------------------------------------
10 PRINT"■■■
```

# OUTPOST: ATARI

## Everything you always wanted to know about disk drives and DOS/**David and Sandy Small**

One of the most perplexing problems for Atari novices (and some experts, too) is the proliferation of disk drives and disk operating systems currently in use. Compatibility is the basic question, and although I know that many of you have your disk systems up and running, I also know that there are probably just as many who would like to upgrade, but don't know where to begin. So let's find out.

There are three types of disk drive for Atari computers. The 810, Atari's original release, is a single density drive that offers 18 sectors per track and 128 bytes per sector. With 720 sectors per disk, it has a capacity of 92,160 bytes.

The 815 is a double density drive that offers 18 sectors per track and 256 bytes per sector. It has the same 720 sectors per disk and a capacity of 184,320 bytes. The 815 was announced but never released; nevertheless, many third party manufacturers adopted the 815 format, so it is quite popular, despite never having been released by Atari.

The 1050, Atari's current model, is a "dual" (not to be confused with "double") density drive with a capacity of 133,120 bytes in 1040 sectors. It has 26 sectors per track and 128 bytes per sector. Atari tells us that in this case, "dual density" really means "enhanced density."

When it comes to actually using one or more of these drives, many people become confused because the 815 and the 1050 have dual personalities. Each has its native mode, but both can also be made to emulate the older 810. So, in general, the 815 and the 1050 can both read and write disks that work on the 810. Apart from the 810 mode, compatibility among the three drives is all but nonexistent (see Table 1).

**In addition to redressing the shortcomings of DOS 3.0, DOS 2.5 compensates for some of the design flaws in the 1050 drive.**

### DOS Update

On top of all this we have the confusion surrounding the various incarnations of DOS for the Atari. When Atari designed the 815, they created a new DOS called DOS 2.0, which could read both 810 and 815 disks. DOS 2.0 was set up to handle either the 128-byte, single density format of the 810 or the 256-byte format, double density format of the 815. In either format, it is restricted to 720 sectors.

Indus, Percom, and other third party manufacturers incorporated this true double density mode in their drives. Some supply their own DOSes, like SpartaDOS and MyDOS, to handle different sector sizes, but all are derivatives of DOS 2.0.

Then Atari released the 1050 with its completely nonstandard dual density mode and DOS 3.0—a slow, buggy operating system that cannot handle 815 formats.

Now, as we discussed last month, we have the new, improved, if somewhat retroactive sounding, DOS 2.5. Table 2 describes current DOS/drive compatibility. Two things are important to note. First, DOS 2.5 has no provision for handling 256-byte sectors. This means that there is no way to read true double density disks with third party drives using DOS 2.5. Likewise, if you have installed the US Doubler in your 1050 to make it truly double density, you will not be able to read double density disks with 2.5. I hope someone comes up with a patch soon.

Second, the 1050 has 1040 sectors. DOS 2.0 is limited to 720 sectors. Hence, you will be able to use only 720 of the 1050 disk sectors if you use DOS 2.0 with the 1050.

In addition to redressing the shortcomings of DOS 3.0, DOS 2.5 compensates for some of the design flaws in the 1050 drive. It is cleverly designed to allow you to transfer information between an 810 format disk and a 1050 disk. How? DOS 2.5 ensures that all files in the "extra" sectors (sectors 721-1040)

**Table 1. Atari Disk Drive Compatibility.**

| | Read By | | |
|---|---|---|---|
| **Source Drive** | **810** | **815** | **1050** |
| 810 | Yes | In 810 mode | In 810 mode |
| 815 in 815 mode | No | Yes | No |
| 815 in 810 mode | Yes | No | No |
| 1050 in 1050 mode | No | No | Yes |
| 1050 in 810 mode | Yes | No | No |

**Table 2. Atari Drive/DOS Compatibility.**

| **Disk Format** | **DOS 2.0** | **DOS 3.0** | **DOS 2.5** |
|---|---|---|---|
| 810 | Yes | Yes | Yes |
| 815 in 815 mode | Yes | No | No |
| 815 in 810 mode | Yes | Yes | Yes |
| 1050 in 1050 mode | Yes | Yes | Yes |
| 1050 in 810 mode | Yes | Yes | Yes |

are set apart by themselves. Thus, when you copy a 1050 disk onto a 810 disk, only the files that fit are transferred.

### New Utilities

DOS 2.5 also supplies a new DOS menu option: P to format disks in single density (or 810) format. If you format a disk using the normal I option, you will get 1050 format; if you use the P option, you get 810 format. So, you see, the operating system automatically compensates for the split personality of the 1050.

(Note for beginners using double density: If you get an Error 139 or Error 143 message, your drive is probably in a different density than the operating system thinks it is in. For example, the drive might be sending 256-byte sectors to a computer expecting 128-byte sectors. There are various methods, depending on the DOS and drive involved, for making sure they match. DOS XL, for example, with Percom, Indus, and ATR-8000 drives includes a utility called CONFIG, which forces the drive into the correct density.)

DOS 2.5 also comes with a utility, called COPY32.COM, designed to copy files from DOS 3 format to 2.5 format. To use it, get to the DOS menu (type DOS from Basic) and then type L to load a binary file. Next, type the binary file name COPY32.COM and follow the directions that appear.

Another utility, SETUP.COM, loaded as above, tells the operating system how many drives you have connected, how many file buffers you want open, and so on, in a friendly, menu-driven format. With DOS 2.0, you had to do some bizarre PEEKs and POKEs to accomplish the same thing.

The FIXDISK utility that comes with 2.5 is not the old Atari Disk Fixer, which was a powerful super zap utility that beginners found perplexing. Rather, it is a friendly way to do things that beginners often need to do to disks, such as unerase them.

The last supplied utility is called RAMDISK, which sets up Drive 8 as a RAMdisk in the extra memory of the 130XE—if you have a 130XE. If you have RAMDISK.COM on your disk when you boot up with DOS 2.5, the disk will load automatically. At that point, D8: is a high speed disk drive, simulated in the extra 64K of memory in the 130XE. It has 499 free sectors available. When initialized, the RAMDISK gives you a "fast load" into the DOS menu and a free MEM.SAV, which prevents you from losing what you were doing when you typed "DOS."

Note: One "design feature" (bug?) of the RAMdisk is that you cannot "duplicate disk" into it. I gives no warning; it just doesn't work. You must use C(opy) *.* instead.

Remember that the RAMdisk has only 64K of memory available and that a standard Atari disk has much more than that. If your disk is more than two-thirds full, it will not fit entirely into RAMdisk. Keep this in mind when you see the Disk Full message.

### Translator

Now that you have a good working knowledge of the idiosyncrasies of Atari disk drives, let's take a look at another minor problem that sometimes plagues new users. If you have one of the new XL/XE machines, your computer has Basic built in (the older Ataris did not). Basic is what comes up when you turn the machine on unless you specifically tell it you want something else by holding down the Option key when you switch the machine on.

Why would you not want Basic? Well, because many programs will not work when Basic is present; both Basic and the program try to use the same section of memory. So, if you buy a program and can't get it to load properly, try disabling Basic.

If it still doesn't work, you might need a Translator disk—a copy of the old operating system that came with the 400/800 machines, the machines for which a great deal of the software currently available was written. The Translator disk allows your software to believe that it is being loaded into an Atari 400 or 800.

How can you get a Translator disk? Probably the best way is from a user's group. Call David Duberman at Atari (408-745-5405), and ask him for the name of a user's group in your area. Most active user's groups have copies of Translator and will be happy to share with you.

If even Translator doesn't get your program up and running, check to see whether the software uses joystick ports 3 and 4, which were built into older machines but have been omitted from the XL/XE series. Atari *Asteroids* is an example of this.

I hope these tips will give beginners and old hands alike a better understanding of Atari disks and DOSes and keep you all computing creatively until next month. ■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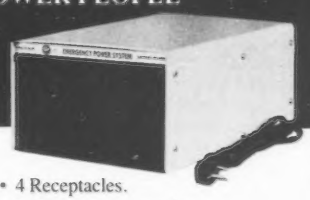

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# IBM IMAGES

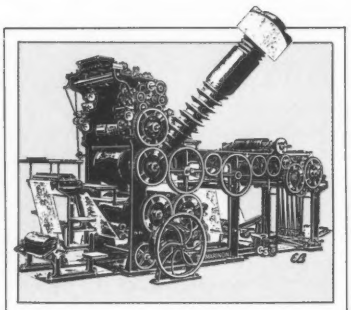
## Printers and other COMDEX wonders/**Will Fastie**

Spring COMDEX in Atlanta holds the distinction of being the largest computer trade show on the East Coast. As such, it would be surprising if there were no announcements of interest to PC-land. In point of fact, COMDEX was rather dull (one clever mind dubbed it CALMDEX), but a most important product was introduced just prior to the show, and by none other than IBM. With a single stroke, IBM dropped the venerable Epson MX-80 in IBM colors (the IBM Personal Computer Graphics Printer, to be precise) and added a new printer called the IBM Proprinter. Announcing just before COMDEX, IBM effectively invited comparison with the numerous printers introduced there.

The Proprinter is no slouch and is a fitting replacement for the Graphics Printer. It is rated at 200 characters per second (cps) and costs $549. It is entirely compatible with its predecessor but has been extended to include 12 pitch printing and near letter quality (NLQ) modes. In NLQ mode, the Proprinter operates at 40 cps, about the same speed as better daisywheel printers. Dot-addressable graphics are supported and are Epson/IBM-compatible. The IBM extended character set (with block character graphics) is included. Up to 94 characters can be downloaded to the printer; the downloaded characters can be used at any time (with proper control codes) and do not affect the ability of the printer to print the standard character set.

IBM wisely stayed very close to the IBM Graphics Printer when they designed the Proprinter. Even the control panel is similar to Epson's, with linefeed, form feed, and online buttons and three indicator lights. I tested the Proprinter with a variety of programs, all of which expected an Epson or IBM printer; all worked flawlessly. The Proprinter is thus a safe choice.

Even as IBM walked the line, they also added a few improvements. The most obvious is the manual paper feed slot on the front of the unit. Using this slot, the operator can feed either cut sheet paper or envelopes for printing. It works well, although envelopes take some getting used to. It is also innovative, because no other printer I have seen in this price range has such a feature. The only drawback to the manual feeder is that continuous paper continues to feed when cut sheets are fed. For a lot of cut sheet printing, the continuous paper should be removed; winding the paper backwards is not reliable on the Proprinter because the page perforation catches on a paper guide under the platen.



**The whole notion of a screw-driven printhead might have scared me. Instead, I'm relaxed about it because I have seen what IBM can do with cams, levers, and screws in other products.**

I gave the printer a reasonable workout and generally liked it. It is noisier than the IBM Graphics Printer, reminding me of a just slightly quieter Okidata. It has a respectable throughput of 130 cps (as measured by *PC* magazine's speed test program). The letter quality mode is not as nice as that of the TI 855 printer, but it is acceptable nonetheless. I found it a little awkward to load paper, and on this matter the otherwise superb manual failed me: the paper path diagrams are not as accurate and detailed as they should be. Ordinarily this would not be a problem, as most printers have similar paths. The Proprinter path, however, is not immediately obvious.

I was most interested to determine the Proprinter's quality of manufacture, so I promptly took it apart. I got more than I bargained for: this machine is obviously designed for robotic assembly and was really hard to disassemble. I did manage it, however, and I got a good look at everything inside. I'm impressed: it is built as well as any Japanese printer I have seen. The electronics are neatly arranged; there is plenty of space on the board, and the power supply seems ample. There are not many parts; an IBM employee at COMDEX mentioned that it contained fewer than 60 parts (excluding all the components on the circuit board). I re-assembled the printer in about a tenth the time it took me to get it apart.

There is also innovation. Almost the whole printer is made of plastic. The machine is assembled without screws (everything snaps together). Rods which traditionally would have been fastened with c-rings instead just snap into place in the chassis. There are no springs. Finally, the head positioning mechanism is strikingly different from what we have come to expect. Instead of the typical belt arrangement, IBM chose to use a screw, driven with a stepper motor, upon which the printhead rides. The "screw" is about 3/4" in diameter, about 9" long, and made of plastic.

The whole notion of a screw-driven printhead might have scared me. Instead, I'm relaxed about it because I have seen what IBM can do with cams, levers, and screws in other products (e.g. robot arms), and I have been impressed. My only reservation stems from the fact that IBM might have chosen this mechanism because it is easier to build than a belt drive, especially if robots are doing the assembly, and not because it is inherently better or more reliable. I could not spend the time (years, maybe?) necessary to wear down the screw to see if print quality would deteriorate, but I could also find no registration problems with either text or graphics.

There is one thing that requires op-

erator care. When the ink ribbon is removed, the cable connecting the printhead to the circuit board tends to flop about. It is quite easy to replace the ink ribbon in such a way that the cable catches. The manual calls attention to this situation, and if care is taken there will be no problem. I call this a goof because IBM usually makes the ribbon-changing process very idiot-proof.

I was not able to tell which of the major sub-assemblies inside the printer were built by IBM and which were subcontracted. However, one part comes from a Japanese company: the printhead is made by none other than Epson.

I can recommend the IBM Proprinter. It is built well, offers good performance and functionality for the price, has a fantastic manual, carries a one-year warranty, and is IBM-compatible.

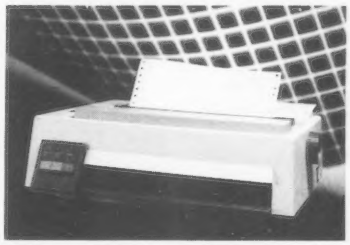
## COMDEX: The Printer Show

I was astounded at the number of new printers I saw at COMDEX this spring. In the past 18 months the printer market has been busy, to be sure, but I was not prepared for this new onslaught.

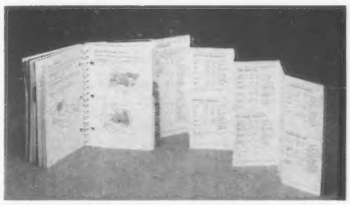
IBM steadfastly maintains that they do not use trade shows to announce products. I suppose that is true, because they never have, but an announcement a week in advance probably qualifies. At any rate, the IBM booth at COMDEX was replete with the new Proprinter, even on PCs where it was not the item being demonstrated. Along with the Proprinter IBM also announced a new color ink-jet printer; it, too, was being demonstrated. I do not review the ink-jet here because I have not had any hands-on experience with it. Although introduced before COMDEX, it was not immediately available. It offers many nice features (including the ability to print on transparencies), so I suggest a look if you are interested in color printing.

Other firms do use trade shows to their advantage. My attention was drawn to just two companies in the new printer fray: Okidata and Mannesman-Tally.

Okidata announced their new models 192 and 193, the latter a wide-carriage version of the 192. There are three new features of particular note in this printer series. First, the printer is much quieter than older Okidata models. This is welcome relief, as most Okidata owners I have spoken with call out the noise as the characteristic of the printer they like least. Second, Okidata has come up



**IBM's new Proprinter. The large slot on the front allows cut sheet paper or envelopes to be fed manually.**



**The masterful document for the Proprinter includes clear drawings and a well-conceived reference card.**

with a much improved ribbon system, foregoing their traditional (and cheap) spools for a compact cartridge. The new ribbon mounts directly on the head and travels with it; it installs easily and does not smear ink on the hands. Finally, the printer can be ordered as IBM-compatible, which in this case means that the extended character set is available.

The new Okidatas are smaller and more stylish than the older 80- and 90-series machines. Options include a tractor feed mechanism and a sheet feeder. I hope to get a chance to examine these new printers more closely because Okidata has achieved what may be the most important factor in the printer business: a reputation for quality and reliability, the very thing that put Epson on top.

I had no chance to look at the new Mannesman-Tally printer. What caught my eye was the very thing that made me buy my own TI 855: font cartridges. M-T's new machine offers a single slot for one plug-in font. Not as versatile as the TI, perhaps, but the printer comes in at a lower price. That makes the new printer worth a look.

While I'm still on the subject of printers, let me air a newly acquired peeve. I have been fuming about how slow Texas Instruments and Hewlett Packard have been in getting new fonts for the 855 and LaserJet, respectively, to the market. Somebody mentioned in passing that TI should have published specs for the design of cartridges. That's it! Those two printers are *closed* systems! We'd all benefit if they were opened up: third party vendors would bring us many fonts, nifty features that the original vendors never thought of, and lower prices ($225 per LaserJet module is absolutely, positively, ridiculous). By the way, I love both of these printers. Understand that my objection is with the companies' current strategy about fonts.

## And now for Speed . . .

One thing I went looking for at COMDEX was accelerator boards for the PC. These are boards that, in effect, contain a complete computer system. The processor is usually an 8086 or 80186 running at a clock rate of greater than 8MHz (fastest seen: 9.54MHz). The board plugs into the PC (in different ways, depending on vendor) and subsumes the function of the original 8088. The result: your PC suddenly runs much, much faster than it used to.

There are several vendors of these boards. Orchid and Kamerman Labs seem to have gotten the jump on the market, but the number of other vendors just announcing or planning such a product indicates that a substantial market is perceived for a performance upgrade of the venerable PC. The question is thus: "Is increased performance a desirable PC upgrade?"

There are about four million 8088-based PCs and XTs out there. Lotus has sold one million copies of *1-2-3*. All the other spreadsheet vendors have probably sold 500,000 copies combined. Therefore, let's assume that about three million PCs run spreadsheets. Now the first performance problem everyone runs into is induced by very large spreadsheets.

First, more memory is added to the system, but then the sheets are too big for diskette. Hard disk solves the size problem (at least to the limits of memory) and also improves the load/save time. And then the user hits the brick wall: recalculation time. For big spreadsheets, recalc is s-l-o-w. Solution? A faster machine, of course. But wait: I've already invested X thousand bucks in this thing and don't look forward to the loss I'll incur selling this at less than book value and then the hit I'll take buying one of them fancy new AT thingies. What to do? Why, how about a measly grand or so for a new, faster processor?

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it should be very compatible with the PC and run just about any software you might have, short of games. That means it will also speed up your word processor and data management software, or make Turbo Pascal compile with AT-like speed. And depending on the type of hard disk activity you usually have, a caching scheme on top of the enhanced processor can bring up total throughput, even if the process is I/O bound. In experiments at *PC Tech Journal*, the Kamerman and Orchid boards both ran a *1-2-3* recalc in less than half the time taken by a standard PC.

Personally, I crave an AT for my house (I've got one at work). But it is not the AT itself I crave: I just want its blinding (well, pretty peppy, anyway) speed. With an accelerator card, I can have that speed for about one-fifth the cost of a trade-in for the AT. That's worth considering.

This is an emerging area, and it is one that will bear watching. ■

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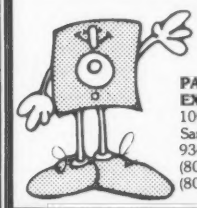

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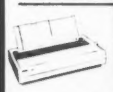

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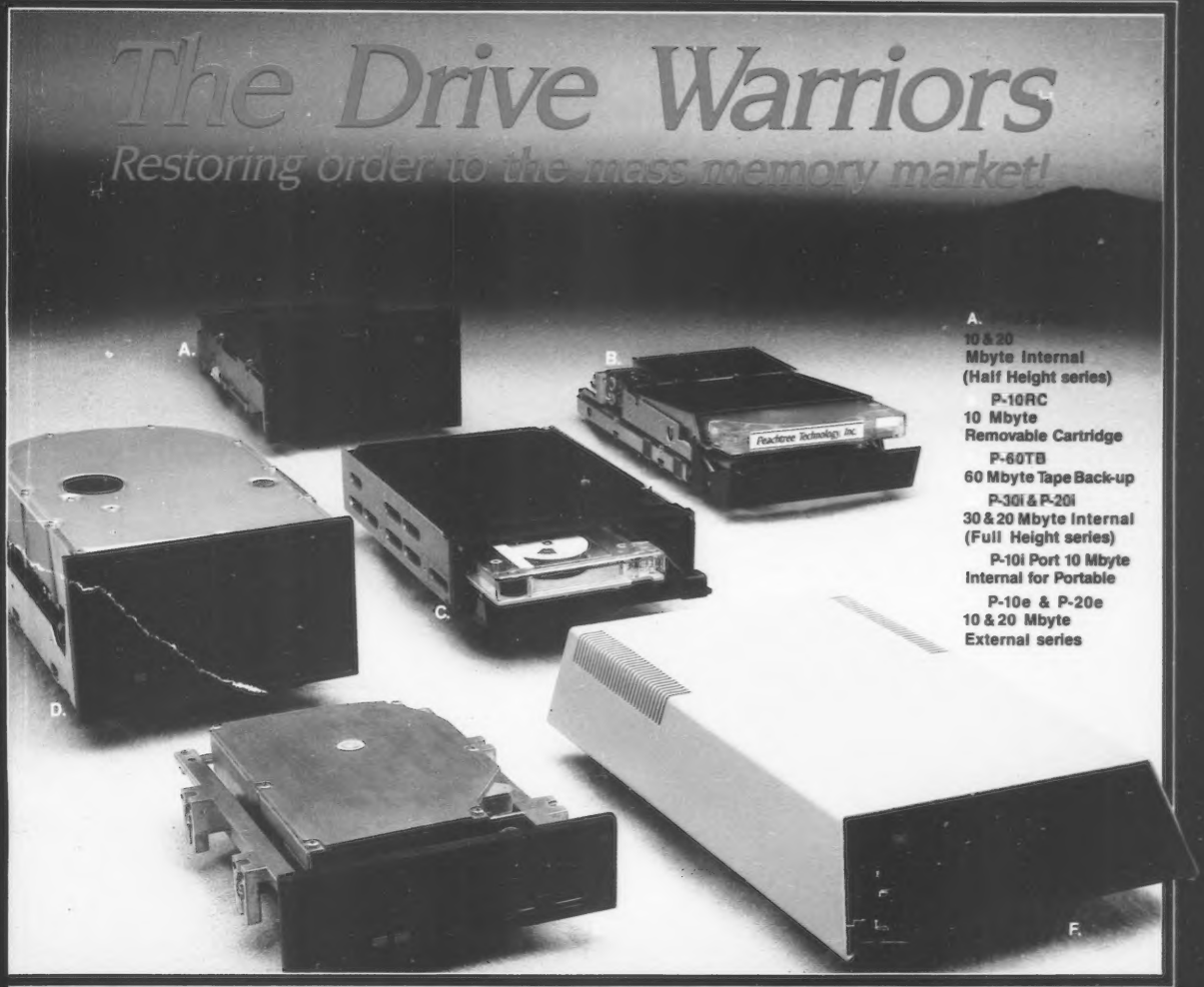


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